STEEL

The

Metalworking Weekly

AUGUST 1, 1960

A PENTON PUBLICATION

Any Letup in Competitive Pinch Could Trigger Some Price Hikes

Faster Spinning Adds Strength To Centrifugally Cast Tubing

Water Based Paints Offer Advantages

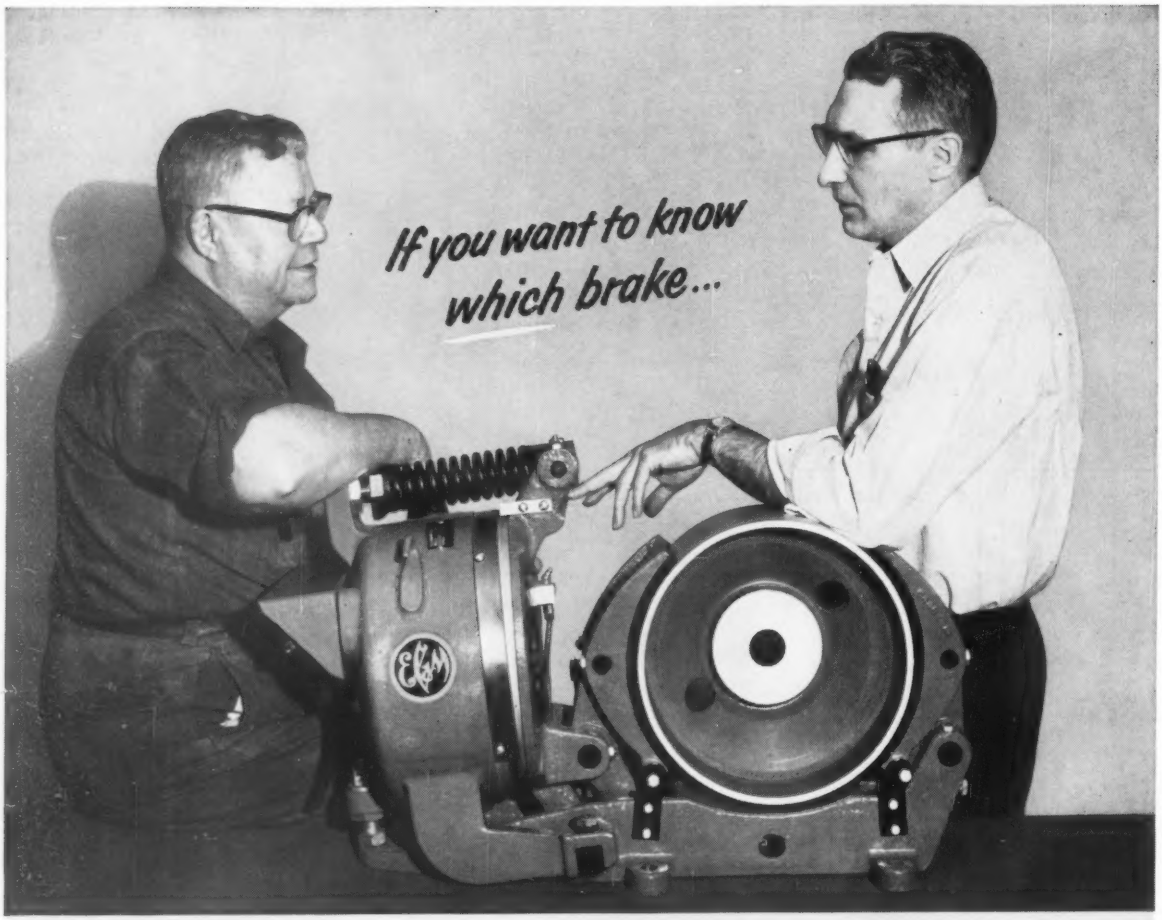
Metal Stocks Near Working Levels; Purchases Will Swing Upward Soon

CONTENTS—TURN PAGE

MATERIALS EFFICIENCY

Make Materials Work Harder

H. T. Price of General Motors Corp.'s Chevrolet-Cleveland Div. shows one way to come up with better use of materials for transmissions: Brainstorming. For other suggestions on how to make metals and nonmetallics work harder, see Page 59



Ask the Maintenance Men!

There are certain standards of performance maintenance men expect of any brake used on crane or mill applications. EC&M's WB Brakes, they'll tell you, have surpassed those standards for years—with plenty to spare.

It's when you ask about installation and maintenance that you'll find why so many of these men prefer Type WB Brakes.

Without getting into a lot of detail, here are a few features of WB Brakes which the maintenance men rate very high—

Manual release for free rotation—a real convenience when you're setting up a new installation. Or want to lower a load on power failure. Or when you're replacing a shoe or lining. ***Single adjustment for lining wear***—so simple yet so positive. ***Connecting lever <u>below</u> brake wheel***—really speeds up armature replacement. ***Recessed armature*** lets dust and magnetic particles fall free—no periodic "digging out". ***No freeze or bind***—if lubrication is ever needed to free any part, WB Brakes have alemite fittings at all points.

***SIX SIZES** of WB Brakes cover the complete range of 600-series motors*
Write for the New Bulletin 5000—it tells all

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This Week in STEEL
The Metalworking Weekly

August 1, 1960 Vol. 147 No. 5

Look for Buying Upturn, Perhaps Some Price Hikes

Competitive pressures on prices have been just as severe in recent months as they were during the '58 recession. Labor costs for most firms have been rising, but most prices haven't gone up. In fact, there's been a good deal of price cutting. However, many metalworkers feel that inventory paring is about over. This should stimulate an upturn in buying, perhaps some price hikes.

PAGE 49

Ultrasonics Branches Out

This rotary ultrasonic welder demonstrates one of the many applications to which ultrasonics is being put. Adaptable to high speed and automated methods, ultrasonics is solving problems in cleaning, flaw detection, gaging, machining, and other processes as well as welding. Already firmly established in the automotive, aircraft and missile, and electronic industries, to name a few, one of the newer markets for ultrasonics is the basic steel industry.

PAGE 54

Centrifugally Cast Tubing Gets Boost in Strength

A new process that produces centrifugally cast tubing that is denser and sounder can be used to make such things as hydraulic cylinders and pistons, normal and high temperature pressure piping, rolls, cylinder barrels and liners, retorts, and pressure vessels. Called the Ceram-Spun process, it was developed by American Cast Iron Pipe Co.'s Special Products Div., Birmingham. A ceramic mold is the key to its success. Acipco has turned out Ceram-Spun tubes of plain and alloy gray iron, Ductile iron, carbon and low alloy steels, stainless and heat resistant alloys, and various nonferrous alloys.

PAGE 82

Rust Preventives Tested for Staining Qualities

A method developed by Republic Steel Corp. researchers will permit rustproofing agents to be evaluated in the laboratory, instead of in the field, where testing is more costly.

PAGE 92

Water Based Paints Called Finish of Tomorrow

You can apply more water reducible paint in one coat than you can with other systems, says Glidden Co., Cleveland. That's only one of several reasons it cites to support a statement that such finishes appear to hold great promise. Some basic rules are given to help you decide which type is best suited for your product.

PAGE 94

Metal Stocks Dip Toward Working Levels

For the last two quarters, metal buyers have been paring their inventories, but it appears the reductions have about gone the limit. A stabilizing trend is appearing. It suggests that a buying upturn may be near.

PAGE 109

COMPLETE CONTENTS ▶

CONTENTS

Metalworking Week, Page 39

The Editor's Views—Counterattack 45
Any Letup in Competitive Pinch Could Trigger Some Price Hikes 49
Eugene Grace Is Dead—Schwab called him "greatest steelman" .. 50
Steel Foundries Develop New Outlets—Seek to offset rails slump .. 51
How a Fledgling Planned Its Growth—Now in third place in its field 52
Ultrasonics Branches Out—Gaging high on list of applications .. 54
Drinkers Drain Profits—Survey discloses "billion dollar hangover" 55
Materials Efficiency—Make Materials Work Harder 59
No. 16 in STEEL's Program for Management for 1960
Two Firms Expand Strategic-Udy Work—Agreement signed 78

Technical Outlook, Page 81

Centrifugally Cast Tubing Gets Boost in Strength 82
Large Vacuum Furnace to Heat Treat ICBM Parts—Stokes builds it 85
Air Conveyors Feed Wire Coaters—Plastic whisked to 61 stations .. 86
Machine Topics—Machine Tool Prices Will Go Up 88
Progress in Steelmaking—Founders Hear Comparison of Converters, Electrics—Both offer clearly defined advantages 90
Rust Preventives Tested for Staining Qualities—A research report 92
Water Based Paints Called Finish of Tomorrow—Reasons are cited 94

Market Outlook, Page 107

Complete Index to Market News and Prices 107
Metal Stocks Dip Toward Working Levels—Quarterly STEEL survey 109
Steelworks Operation Chart and District Ingot Rates 112
Scrap Composite Moves Higher—Up 16 cents to $31.83 124
Nonferrous Metals—Aluminium Announces New Process 128
Union Carbide Revises Price Schedule for Chromium Alloys 131

WHERE TO FIND

Servicenter 5
Calendar of Meetings 10
Editorial & Business Staffs 16
Metalworking Pulse 42
Windows of Washington . 56
Mirrors of Motordom 65
The Business Trend 69
Men of Industry 73
Obituaries 50, 76
New Products 97
New Literature 105
Advertising Index 133

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World's most powerful radio station requires 200-ton counterweights with steel plate shells

A giant metallic spider web, hung from 26 steel transmission towers almost 1,000 ft high, will be the heart of the world's most powerful radio station, reaching out to surface warships and missile-firing submarines in the North Atlantic. The $67-million, U. S. Navy communications center is located on a rockbound Maine peninsula.

For the vast antenna network to remain taut and operate efficiently, despite fluctuations in temperature or high winds, a system of thirty-six 200-ton counterweights is being installed. Specifications require that the steel plate counterweights be perfectly balanced and roll smoothly along their track sections.

The counterweight shells, each fabricated from 30 tons of steel plate, measure 12 ft wide across the flat ends, and 13½ ft in outside diameter. They are composed of three cylinders, four cone sections, two end plates, and two track sections. The largest cylinder is 2-in. plate, others are 4-in. plate, formed in half sections, then butt-welded together. When completed, they are filled with concrete to provide the necessary weight.

Replaceable wear tracks for each shell are made of 1-in. plate, 19-in. wide. Separate curved track sections, which fit into the concrete base of the giant towers, are also fabricated from Bethlehem plate 14-in. wide and 3-in. thick. The wear tracks will roll on these sections.

Bethlehem is also fabricating the steel yokes which straddle the counterweights and connect them to the cable system. These yokes, each weighing 7½ tons, are constructed mainly of 1-in.-thick plate and are of all-welded construction.

Steel *for Strength . . . Economy . . . Versatility*

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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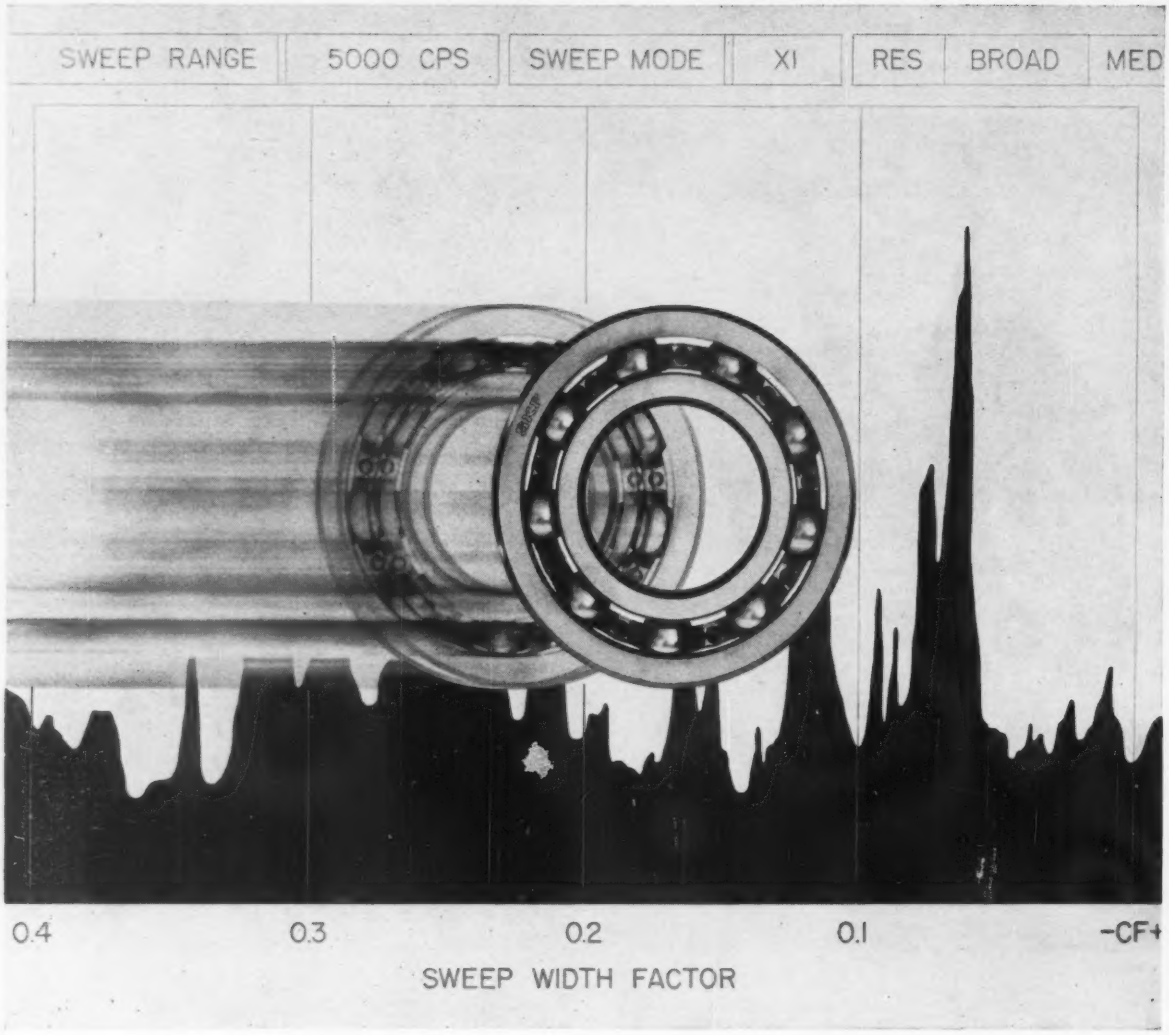


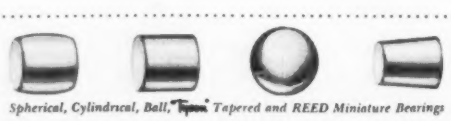
Now, SKF reduces the noise level of ball bearings by 50%!

New SKF ball bearings run twice as quietly as standard single-row deep-groove bearings – six times more quietly than bearings produced just two years ago.

They're designed especially for applications where noise is an important factor. Eight manufacturers, who use-tested them for over a year, now back-up their approvals with repeat orders.

Every bearing meets new, more critical standards. Each type and size meets special requirements for reduced vibration. Every ball meets very low waviness limits. Each cage meets critical standards for smooth, quiet performance.

SKF will make a comparison check of these improved bearings against the bearings you're now using. See for yourself! Just call the SKF branch office nearest you. 6013



Spherical, Cylindrical, Ball, "Thrust" Tapered and REED Miniature Bearings

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General industrial handling service—of any and all shapes, sizes and weights of loads—whether boxed, bundled, cradled, crated, palletted, roped or chained—is more quickly, more precisely and more safely accomplished with a good overhead electric traveling crane than with any other form of material handling equipment.

In many plants Northern Cranes, operating at higher speeds and with highly precise electrical controls, in two-and three-shift service every day with production maintenance duty over week-ends, have records of long, continuous performance with minimum crane maintenance. They provide you with assured dependability.

The above 30/10-ton capacity Northern Crane, 57-foot span, serves the diversified needs of the receiving-shipping dock of an integrated automobile parts manufacturing plant.

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look overhead . . . see "NORTHERN"

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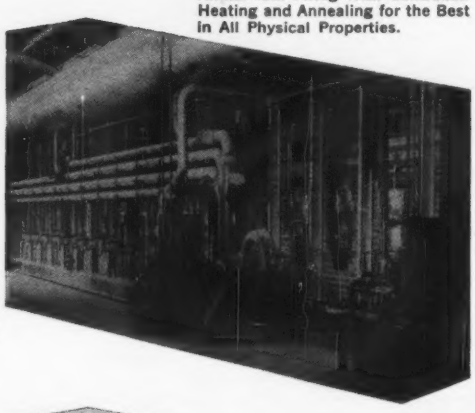


Serving Western Industries... Harbison-Walker Fireclay Refractories made in all classes at Ione, California plant

assure best service in every application

Produced in the commercial classes and various special modifications, these brands most economically fulfill every industrial furnace need for fireclay refractories. They meet the A.S.T.M. specifications with an added margin of quality.

Basic factors of paramount importance in the manufacture and use of these unsurpassed fireclay refractories are unexcelled quality of clays, sustained research, modern manufacturing facilities including the benefits of long experience and best skills, rigid quality control and technical assistance in all applications. The following significant analogies serve in making the choice of the best brick for various particular uses.

how ZENITH (superduty) compares with high-duty fireclay brick

In refractoriness, resistance to corrosion by fluxes and thermal shock, high temperature strength and stability of volume in soaking heats, ZENITH is measurably better than high-duty brick.

In cold strength, thermal expansion and thermal conductivity, ZENITH is similar to high-duty brick.

In porosity, permeability, slag penetration and basic oxide content, ZENITH is lower and better than most high-duty brick.

WESTERN high-duty fireclay brick... power pressed

Among the best high-duty fireclay refractories, the quality of WESTERN brand is maintained on the high side of the average—in refractoriness—physical strength in soaking heats—constancy of volume at high temperatures and spalling resistance.

WESTERN T high-duty fireclay brick... extruded

WESTERN T in the class of high-duty fireclay brick made by the extrusion method, possesses enhanced properties of low porosity and permeability by slags, abrasion resistance and high strength.

AMADOR medium-duty fireclay brick... power pressed

AMADOR is the power pressed, medium-duty companion to these brands of special merit. In various rectangular sizes it is second to none in workmanship. It complies with the A.S.T.M. classification by a liberal margin.

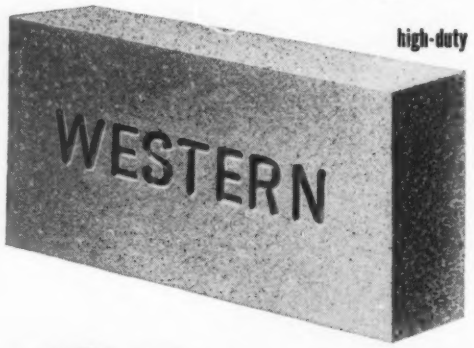
MORTARS

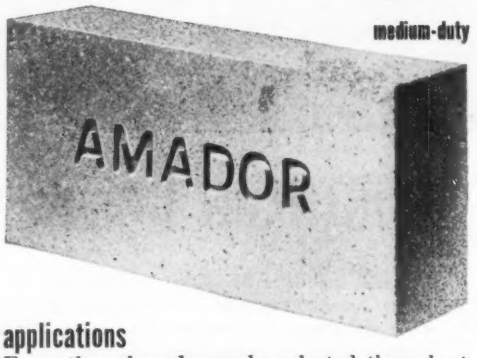
All corresponding mortars are available for every requirement in the use of these brands.

MONOLITHIC REFRACTORIES

Available also are the Harbison-Walker castables, plastic firebrick and ramming mixes of all kinds—balanced for the selection of the most serviceable product for each particular need.

HW 60-18





applications

From these brands can be selected those best suited for specific operating conditions. Some typical uses in which they serve with splendid results are the following: • Boiler Furnaces • Ceramic Kilns • Cement and Lime Kilns • Chemical Plant Requirements • Cupolas • Electric Furnace Roofs • Heating Furnaces • Metallurgical Furnaces • Petroleum Refining and Petrochemical Furnace Equipment • Regenerators and Checkers of Glass and Steel Furnaces • Steel Plant Mill Brick Needs • Blast Furnace Stoves and Piping • Carbon Electrode Baking Furnaces

Harbison-Walker Refractories Co.

and Subsidiaries

West Coast Offices: San Francisco 5, Calif. Los Angeles 22, Calif.
General Offices: Pittsburgh 22, Pennsylvania

World's Most Complete Refractories Service

Bearing Sales Roll Toward Record

Pittsburgh Resident Editor Bill Wallace picked up some choice items while digging out the story you'll be reading next week under the above headline. In a crosscountry phone survey, Bill heard about a host of all too real foreign threats to domestic bearing producers, one in particular.

Remember Usa? It's the Japanese town that was renamed so products from there could be exported with the words "Made in USA" stamped on them. Well, now Usa is headquarters for a bearing firm named Timke. Pretty casual, eh?

Despite foreign opportunism of that stripe, bearing manufacturers expect the industry's sales to take a good jump this year. Prices are guaranteed in some cases . . . imports remain low . . . international standards for ball and roller bearings may spur export sales . . . miniatures for missiles are booming . . . and you can get the rest of Bill's market story next week.

The $20 Billion Challenge

We have a surfeit of challenges these days, what with the Republican and Democratic platforms, strife in the Congo and Cuba, and the "spy plane" incidents, but we don't feel guilty about adding this one to the list.

The $20 Billion Challenge is the title we've put on the book that contains the first 13 articles in STEEL's 1960 Management Series on Production Efficiency (publishing dates ran from Jan. 11 to June 20). You can obtain it by writing to: STEEL, Promotion Dept., 1213 W. Third St., Cleveland 13, Ohio. Price: $2 per copy.

You will recall that we take this position: Metalworking, this nation's largest industry, is more than $20 billion short of optimum production efficiency. If we could overcome that deficit, via the purchase of modern metalworking equipment, we could spur productivity to offset rising employment costs, halt inflation, and recoup our foreign trade losses.

You'll find the how-to in the book, including how to diagnose your equipment needs, how to organize to buy equipment, how to sell production efficiency to the boss, and how to find the money for it.

A separate chapter is devoted to depreciation reform, a crusade which STEEL launched seven years ago. You can get our complete coverage of that subject by writing for our book entitled *Depreciation Reform*. It's available without charge from our Promotion Department.

Watching the Watchmen

Ever wonder what plant watchmen do (or should do) aside from punching a time clock?

Pinkerton's National Detective Agency views the guard as a combination firewatcher, policeman, detective, maintenance man, and general housekeeper.

Here are 19 things it trains its men to do, especially on the first tour: Check for open windows; unlocked doors and gates; use of unnecessary lights; electrical equipment or appliances left operating; leaks involving such things as steam, water, and oil; blocked aisles; blocked fire extinguishers and hoses; blocked fire doors; evidence that equipment is overheating; company products, equipment, or materials apparently hidden or set aside under suspicious circumstances; evidence of illegal entry or trespass; uncovered containers of solvents; oily rags; evidence of smoking in nonsmoking areas; roof leaks; unusual sounds; closed sprinkler valves; unusual odors; and any unsafe conditions.

Can You Get Too 'Technical'?

Business paper editors often debate ways of handling the so-called technical story.

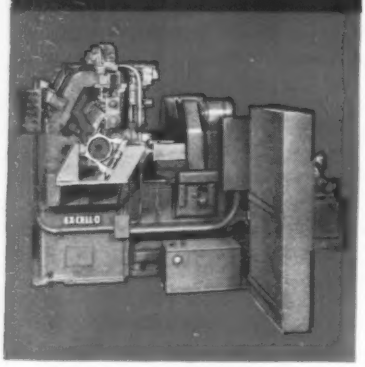
One group contends: "Technical articles are for engineering and production people, so they should be written in their language."

Their opponents reply: "But you're forgetting the administrative and purchasing people. Why not delete the long hair stuff and give the story a more popular approach?"

We cross swords with both camps. They assume that the subject has something to do with the readability of an article. For our money, the real difference is in the writer. If he knows his subject and his profession, he can turn out a "technical" story with universal appeal. And we have readers who agree with us.

Here's one of 85 commendatory letters we've

Step-by-Step Automation with Ex-Cell-O Specials



Your first step into automation may cost much less than you think. In medium-sized shops, for example, a profitable, automated set-up may involve the purchase of a relatively simple transfer machine, such as the one illustrated above, consisting of two standard way-type units. Or, even more simply, a single standard machine which easily fits into automated set-ups later on.

In any case, a host of Ex-Cell-O engineers, laboratory technicians and production specialists are at your service. *No obligation whatsoever.* Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit.

SEND FOR FREE BROCHURE

This 20-page catalog will show you the most profitable way to put automation into your present operations—make your own "Automation Appraisal." Ask for Bulletin 50155.

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received so far in response to a nontechnical technical article written by Metallurgical Editor Ed Case, "How to Tell Good Hot Dip Galvanizing," p. 76, June 27. It says in part:

"We feel your magazine has rendered a distinct service to steel fabricators in publishing this article, and would like to see more of this type published. There is far too little nontechnical material on this subject available to purchasing agents and others concerned with procuring high quality, hot dip galvanizing on items of their manufacture."

The letter is signed by Gene M. Goode, assistant manager, Kansas City Div., Rogers Galvanizing Co. Inc., Kansas City, Mo.

How to Wreck a Conference . . .

. . . Is a chapter title in the American Management Association's book, *The Embattled Executive*. The cartoon's caption reads: "Don't read any report that will be discussed. Instead buttonhole the author in the hall 5 minutes before the meeting, and ask him to sum up six months' work in six easy sentences. No long words, please —you're in a hurry."

You Can Win $1000 This Month

There are five issues of STEEL this month—and one could help you win $1000 in our Usership Idea of the Month Contest.

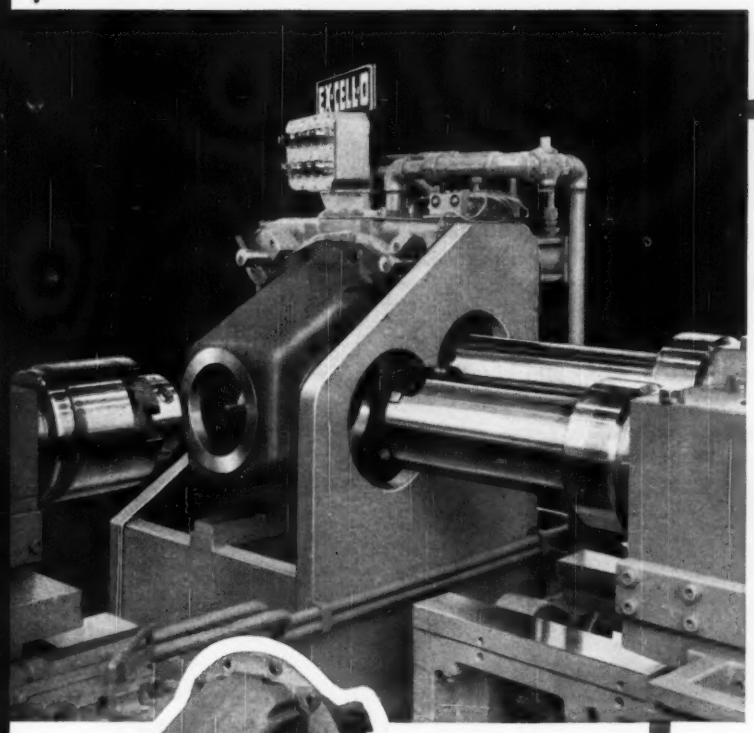
Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—August, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—you will win $500.

There's more . . . You will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

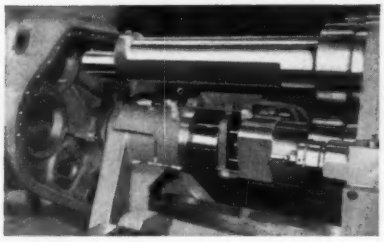
You can enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is Oct. 1.

Ex-Cell-O Custom Machines Specialize in Difficult Jobs!



HEAVY-DUTY BORING—Custom Boring Machine uses three heavy-duty Ex-Cell-O Precision Spindles to simultaneously finish-bore four holes and bore-and-face a fifth hole in this 75-pound cast-iron housing in a 4½ minute cycle. Diameters are about 6″; tolerances are held within .001″.

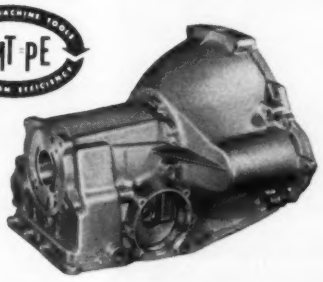


MULTI-DIAMETER BORING—In a single cycle, the long boring bar on this Custom Machine line-bores two holes while shorter bar below it bores a third diameter, and small spindle in foreground bores a dowel hole in this huge clutch and gear housing.

Whether you have a simple job that must be done faster and more accurately, or complex work that requires multiple machining operations, an Ex-Cell-O Custom Machine may be just the answer you've been looking for . . . the economical solution to a difficult production problem.

See your Ex-Cell-O Representative, or contact Ex-Cell-O's Machinery Division in Detroit for details on the limitless applications of Ex-Cell-O Custom Machines.

MMT PE



HIGH PRODUCTION—Aluminum transmission case shown above is turned 90°, rolled over 180° as it passes through a 24-station Custom Machine. Automatic operations include precision boring, facing, chamfering, radial milling, tapping, trepanning, air gaging and flushing. Output is 124 parts per hour.

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION

EX-CELL-O FOR PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • CONTOUR PROJECTORS • GAGES AND GAGING EQUIPMENT • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • ATOMIC ENERGY EQUIPMENT • RAILROAD PINS AND BUSHINGS • DAIRY AND OTHER PACKAGING EQUIPMENT

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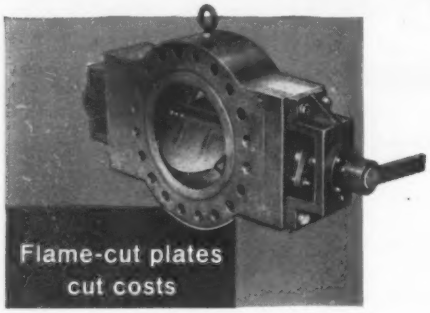
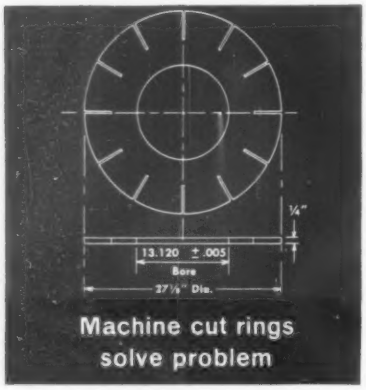
METALOGICS* IN



HIGH REJECTS: Use of flat steel castings for valve bodies, with I. D. ranging from 4″ to 60″, accounted for increases in costs for this manufacturer. Pattern costs rose because of numerous changes . . . rejects were high due to porosity and other casting faults that showed up only after machining.

HIGH QUALITY: Ryerson recommended using flame-cut plates ranging in thickness from 1″ to 8″. Results: greater production flexibility, faster delivery, lower cost and a stronger product for this high-pressure service. Tight Ryerson quality control delivered plates of exceptionally clean surface to exact thickness of finished product, requiring little machining.



PLATES REQUESTED: Ryerson was asked to bid on supplying ¼″ Type 410 stainless in 27½″ square plates. Material was to be used for orifice plates for 16″ burner, subjected to elevated temperatures.

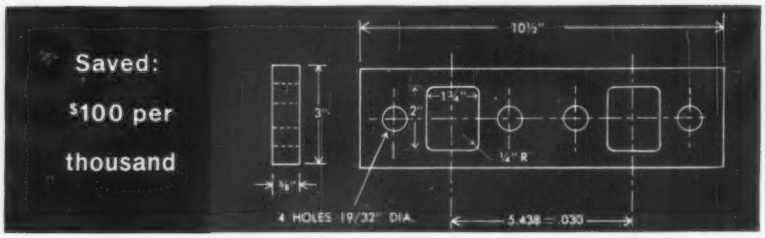
RINGS RECOMMENDED: Going beyond material specs, the Ryerson representative found that the customer intended to cut plate into 27⅛″-diameter rings with 13.120″ bore—and then mill 12 slots in outer diameter for expansion relief. Knowing the application, Ryerson recommended supplying machine-cut rings in which slots could then be punched rather than milled. Production savings enabled switching to Type 304 at less cost than Type 410 with slots milled.

Look at these random examples and see how Ryerson Metalogics sparks real savings by continually searching for and suggesting new materials, methods and techniques.

The broadest experience anywhere combines with the widest range of stocks available to offer you unbiased recommendations on the best material for any job—be it steel, aluminum or plastics. Always the right metal-fabricating machine, too—for Ryerson is the nation's largest distributor.

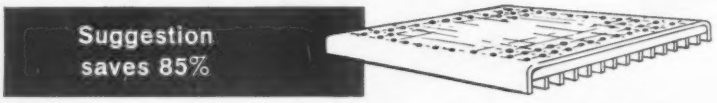
Your Ryerson representative is "Metalogics-trained" to help you *value-analyze* selection, fabrication and application problems. Get his constructive ideas soon, and see how he can help you select and apply material from our vast stocks. It's the "Metalogical" thing to do.

**The Ryerson science of giving optimum value for every purchasing dollar.*



PROBLEM: Muffler manufacturer required accurately finished mounting plates made from ⅜″ x 3″ bar. Cutting bars to size, burning 1¾″ x 2″ holes and drilling four 19/32″ holes proved time-consuming and expensive.

SOLUTION: Ryerson recommended that they eliminate cutting, burning and drilling operations by stamping the part from Ryerson forming-quality plate. One operation instead of three cut costs $100.00 per thousand pieces and quickly justified the small initial investment in dies.



ASKED FOR: Customer wanted 1″ hot rolled plate to cover about 80′ of 24″ open trench. Plate was to be cut into 24″ x 27″ segments—each containing 900 ⅜″ holes to filter the product.

RECOMMENDED: After studying application and cost, Ryerson recommended a design combining perforated light plate, formed to channel shape, and grating for structural support. Ryerson experience and imagination saved 85% of the original cost.

Soft touch on fabricating sheets

THE NEED: Cold rolled sheets that would take severe forming and retain smooth, dull surface for high lacquer finish. Sheet quality was found on inspection to vary widely from one shipment to the next, causing variations in forming and finishing operations . . . high reject rate.

THE ANSWER: The Ryerson representative showed how our stringent quality controls would assure consistent quality on every shipment so that forming and finishing could be standardized for better results . . . lower production cost figures

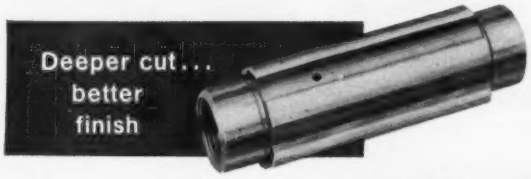
ACTION

BEFORE: Job shop was using MT 1015 tubing in the manufacture of this coupling. Machinability was satisfactory, but rising costs of operation led to a search for ways to economize.

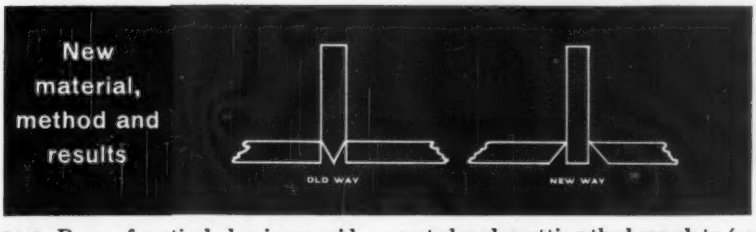
AFTER: Careful study by the Ryerson representative brought about a change in material. He recommended using Ledloy® 170 tubing, which increased machining speed to 170 s.f.m. and stepped up production 30%. Ryerson's stocks include the widest range of fast machining alloys—types and sizes to fit your every need.

OLD WAY: A screw machine shop used nylon in the manufacture of nipple adapter and coupling nuts—until a Ryerson representative came on the scene.

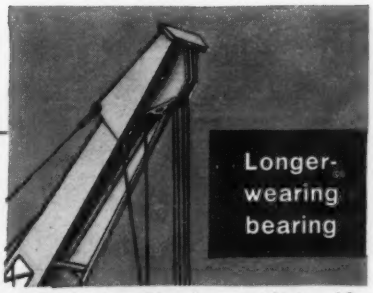
NEW WAY: At his suggestion, they changed to Ryertex-Omicron PVC—cut costs 50%. PVC machined better—to closer tolerances, with improved finish . . . ran faster without "gumming." Note exact cutting of threads and barbs. Threads fit perfectly.



SEARCH: Complicated machining of a carbide grade gear shaft included cuts up to ½". It was discovered that required machining was too slow with the steel chosen for the job.
ANSWER: Rycut® 40 was recommended by the Ryerson representative. This free machining alloy fit the situation perfectly. The company found that Rycut 40 machined at 250 s.f.m., gave a better finish, increased tool life, and lowered total per-piece cost. An alloy in the Rycut series may well lower your costs.



OLD: Rows of vertical aluminum grid members were attached to an aluminum base plate by notching the grid members and welding. (2024-T3 aluminum plate was used.) However, upon cooling, welds fractured—causing a high reject rate on this assembly.
NEW: A Ryerson representative suggested undercutting the base plate (as shown) instead of the grid members. This exposed a greater area to heat and permitted a larger deposit of weld material. Another Ryerson suggestion: change material to 5052-H34 aluminum, which responds better to welding operations.



5-DAY LIFE: The sheaves that guide the enormous digging buckets of underwater dredges take a very severe load. Bronze bearing in the sheaves had to be replaced every four or five days.

5 MONTHS, SO FAR: After discussing the problem with a Ryerson man, the chief engineer decided to try a bearing made of Ryertex. The change was made, and five months later hardly any wear was noticeable! With its low friction coefficient, Ryertex is nonbinding, even on itself.

2 metalworking machines for the price of 1

A fabricator of stainless steel kitchen equipment was recently in the market for a new squaring shear. The one under consideration had a gap-type frame which would enable him to do an important notching operation—necessary for certain sink tops. After careful study, a Ryerson machinery specialist recommended *two* pieces of equipment instead of one at no increase in total cost. The first, an underdriven shear. The second, a universal-type sheet metalworking machine that would do the required notching, plus many other jobs—adding versatility to the entire operation.

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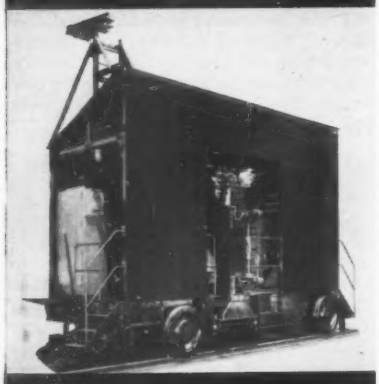
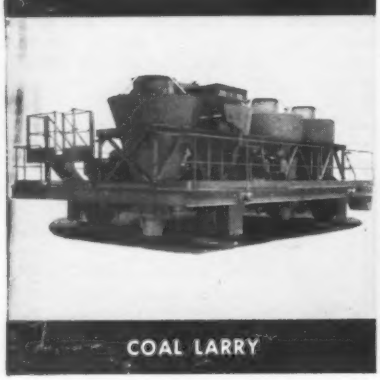


DOOR MACHINE



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CALENDAR OF MEETINGS

Aug. 8-12, American Institute of Electrical Engineers: Pacific general meeting, U. S. Grant Hotel, San Diego, Calif. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Aug. 15-17, American Society of Mechanical Engineers and American Institute of Chemical Engineers: Heat transfer conference and exhibit, Statler-Hilton Hotel, Buffalo. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Aug. 16-19, Society of Automotive Engineers Inc.: National West Coast meeting, Jack Tar Hotel, San Francisco. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 3-4, American Machine Tool Distributors Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Sept. 6-16, National Machine Tool Builders' Association: The Machine Tool Exposition — 1960, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 6-16, Production Engineering Show: Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 7-9, American Society of Mechanical Engineers: Instruments and regulators conference, Massachusetts Institute of Technology, Cambridge, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 7-15, Coliseum Machinery Show: Coliseum, Chicago. Information: A. Byron Perkins & Associates, 2807 Sunset Blvd., Los Angeles 26, Calif.

Sept. 12-13, Industrial Truck Association: Fall meeting, Cavalier Club, Virginia Beach, Va. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Sept. 12-15, Society of Automotive Engineers Inc.: National farm, construction, and industrial machinery meeting; production forum; and engineering display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 13-15, American Chemical Society: Fall meeting and exhibit, Statler-Hilton Hotel, New York. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

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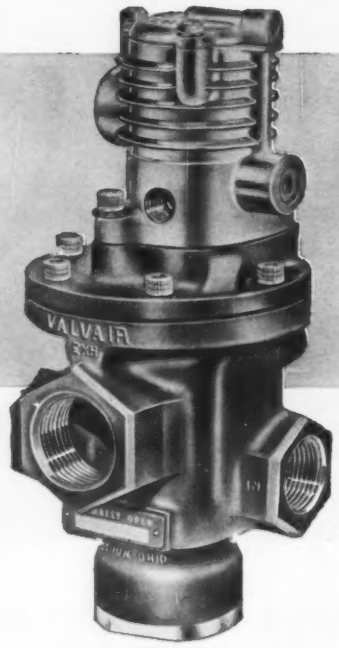

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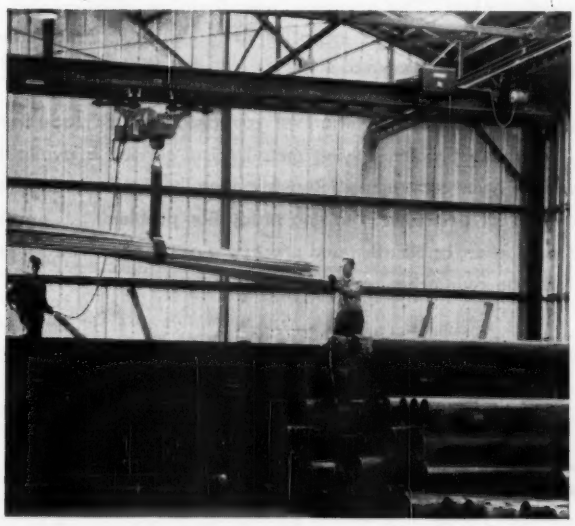

CRANE-O'FALLON CO., Denver, branch of the Crane Co., a large plumbing, heating equipment, valve and fitting manufacturer, installed a Cleveland Tramrail crane for handling pipe out of railroad cars into trucks for immediate delivery or into storage. The crane so speeded the work that now a 100,000 lb. car can be handled for what it formerly cost to unload a 60,000 lb. car.

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The group of masonry construction accessories, pictured, are among those fabricated from Republic Manufacturers' Coarse Wire by Meadow Steel Products, Inc., Birmingham, Alabama.

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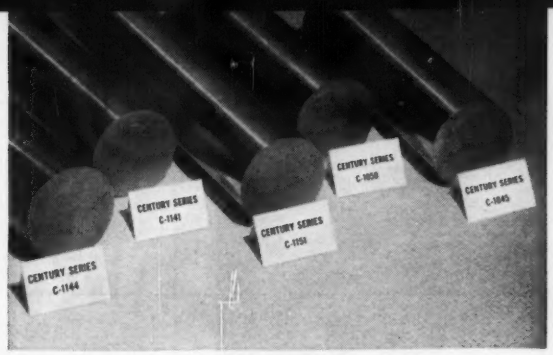

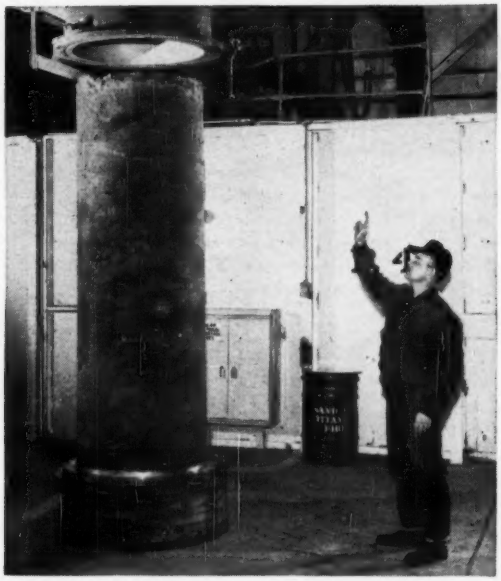

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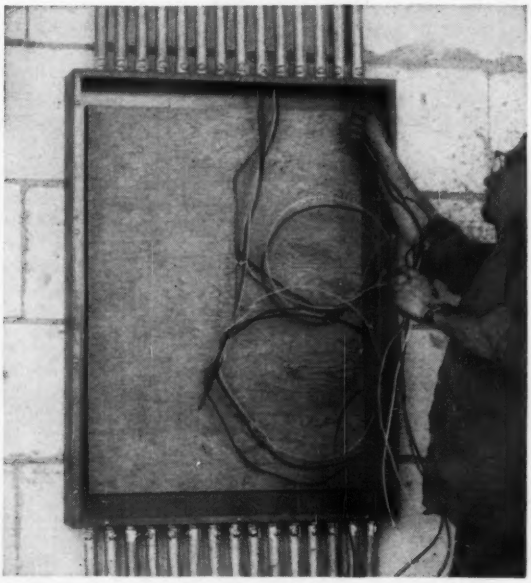

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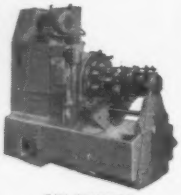

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New!
Now Bethlehem forges every hardened steel roll from vacuum-degassed steel!!
On the following pages, see why you should look for this label on the packing of the rolls you buy.

Bethlehem vacuum-degassed steel minimizes the hazard of roll breakage

Pint size, king size, every in-between size. Now Bethlehem forges *every* hardened steel roll from vacuum-degassed steel.

Pioneer in "vacuum casting"

Bethlehem pioneered the development and use of vacuum-degassed ingots for highly stressed applications in the electric power, atomic energy, and other industries.

Our advanced steel-pouring techniques now permit us to pour molten steel from a furnace ladle to a secondary ladle within a vacuum chamber, and thereby remove harmful gases (we can also pour directly into a mold in the vacuum chamber). The secondary ladle is then taken out of the chamber and ingots of suitable size for hardened steel rolls can be cast under a blanket of inert gas.

Less gas means sounder steel

Because the vacuum-casting method reduces the volume of hydrogen and other gases, the steel is sounder, tougher, and cleaner than air-cast steel. It is this greater internal soundness which reduces the hazard of roll breakage.

Over 350 rolls now in service

In the past several years, we've produced and shipped over 350 large, vacuum-degassed hardened steel rolls. The outstanding performance of these rolls confirms our own production experience, which clearly proves the superior soundness of vacuum-cast rolls as compared to air-cast rolls.

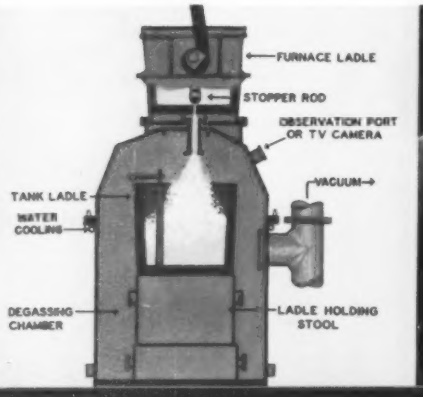
Fast delivery . . . no extra cost

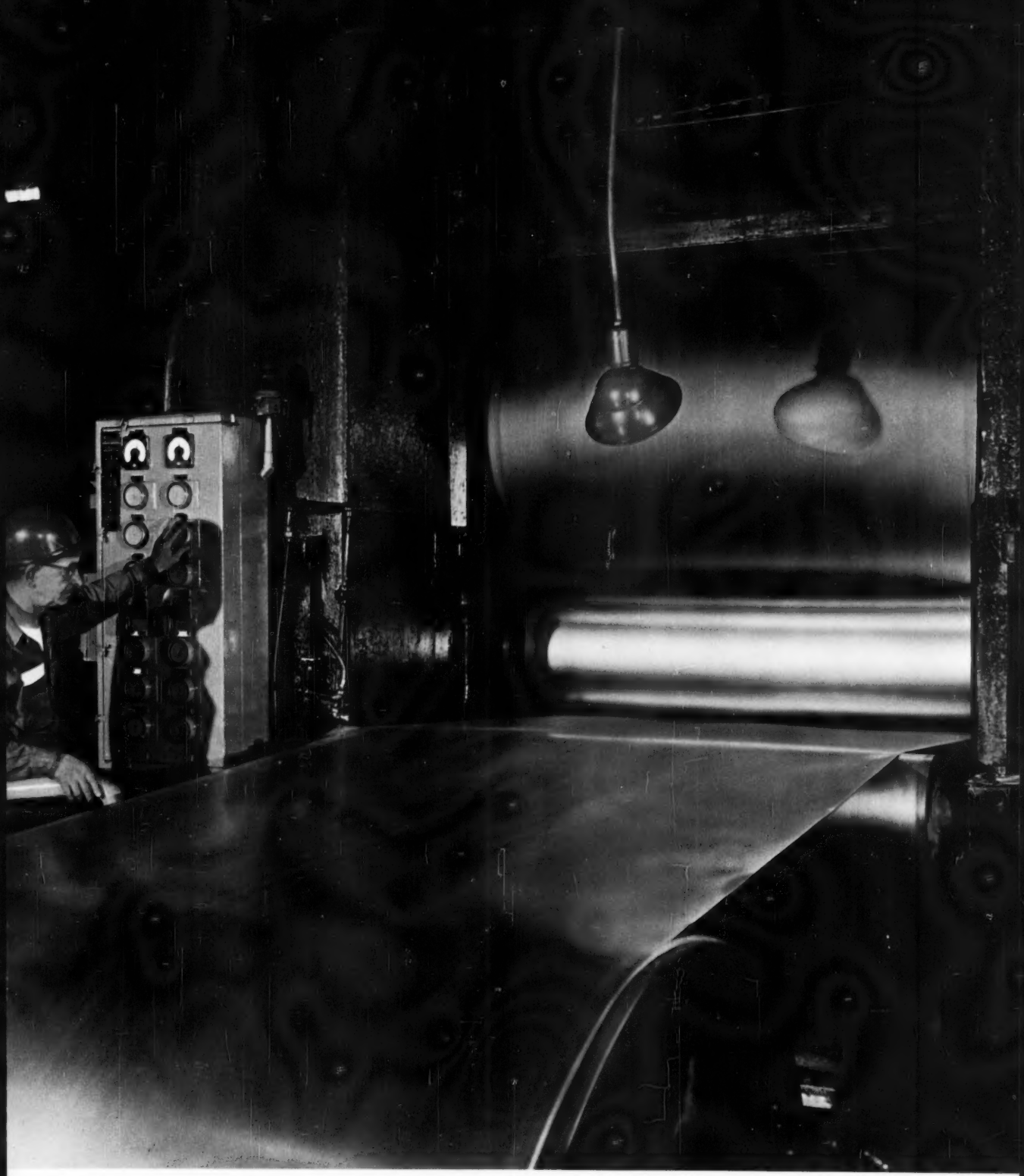
You have everything to gain (less roll breakage), nothing to lose (no price extra) by making your next purchase of hardened steel rolls Bethlehem vacuum-degassed rolls. Deliveries are excellent. Our sales offices are ready to give you the *whole* interesting story of this new Bethlehem development. Call or write the office nearest you today. Or write to us at Bethlehem, Pa.

STEEL IS TAPPED from the furnace into the furnace ladle. The furnace ladle is then attached to the vacuum tank, and the molten metal pours through a vacuum-tight seal into either a secondary ladle or a mold inside the degassing chamber. If poured into a ladle, ingots can be subsequently cast from this ladle under a blanket of inert gas.

TV TELLS HIM WHAT'S GOING ON. One TV camera peers inside the high-vacuum chamber into which the hot steel is gushing and shows the stream coming from the furnace ladle (top screen). Another camera, whose picture appears on the bottom screen, shows the action of the hot steel as it flows into either the secondary ladle or the mold set up inside the vacuum tank.

ULTRASONIC SOUND WAVES, pitched so high you can't hear them, penetrate every inch of the Bethlehem vacuum-degassed roll you see here. The waves relentlessly search out any possible inner discontinuities which, if present, would be indicated on the screen. When the Bethlehem inspector gives his OK, you can rely on the soundness of that roll.





BETHLEHEM VACUUM-DEGASSED ROLLS are made for every application—cold-rolling steel sheet, strip, tinplate, and non-ferrous metals. Every roll meets your specifications *exactly* on size, shape, hardness, and finish.

BETHLEHEM STEEL

BETHLEHEM STEEL

CHECKING EVERY DETAIL is more than a routine habit in the making of Bethlehem vacuum-degassed forged rolls. It's done with an extra measure of thoroughness, extra care—from the analysis of the steel to the critical inspection of the finished product.

These are the new symbols of quality for hardened-and-ground forged steel rolls

LOOK FOR THIS LABEL on the packing of the hardened steel rolls you buy. It's your guarantee that your rolls are forged from Bethlehem vacuum-degassed steel . . . steel that minimizes the hazard of roll breakage in your plant.

LOOK FOR THIS "V" STAMP on the ends of the rolls you buy. . . . "V" is for vacuum. You'll find this permanent identification on every Bethlehem roll from now on . . . because from now on Bethlehem forges hardened steel rolls *only* from vacuum-degassed steel.

For strength
. . . economy
. . . versatility

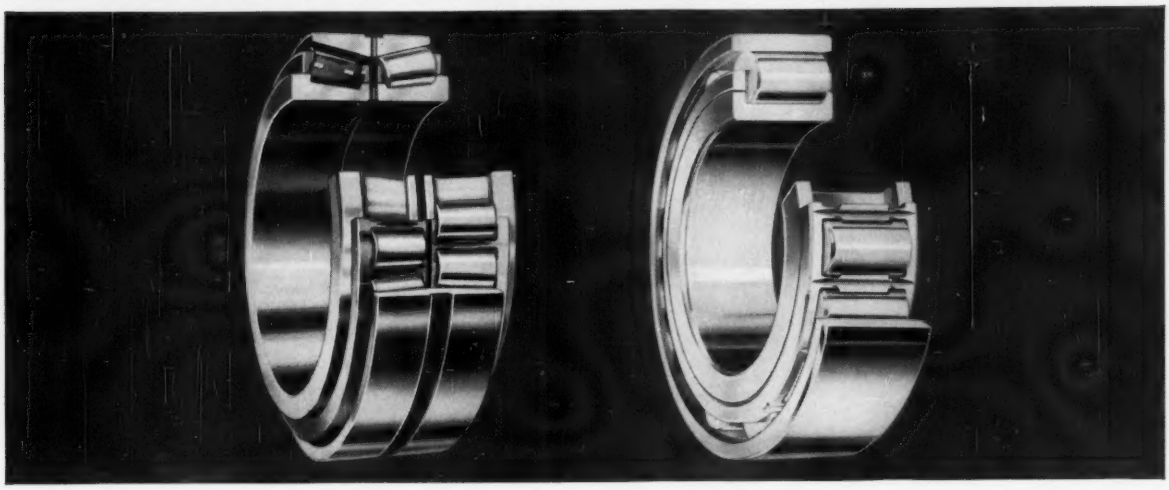
Steel

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

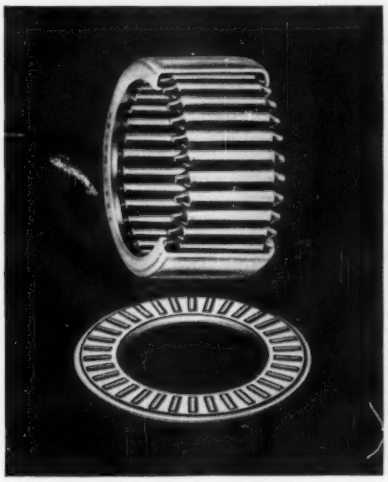
BETHLEHEM STEEL

BETHLEHEM STEEL

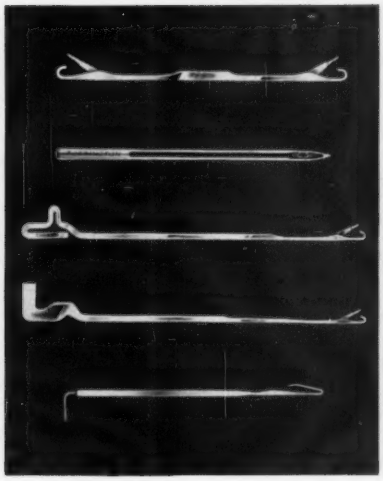
YES, TORRINGTON IS A LEADER IN THE PRODUCTION OF TAPERED AND RADIAL ROLLER BEARINGS...



BUT THIS, TOO, IS TORRINGTON...



Pioneer maker of the revolutionary needle bearing and needle thrust bearing, widely used in a variety of products including jets, missiles and rockets where space is at a premium.



Since 1866 America's largest producer of precision-made machine needles for every need—knitting, sewing, tufting, felting – and a leading manufacturer of surgeons needles.

World's largest manufacturer of rotary swaging machines for fast, economical chipless machining in the production of metal parts for thousands of uses throughout industry.

In these and many other fields throughout the world Torrington is contributing to

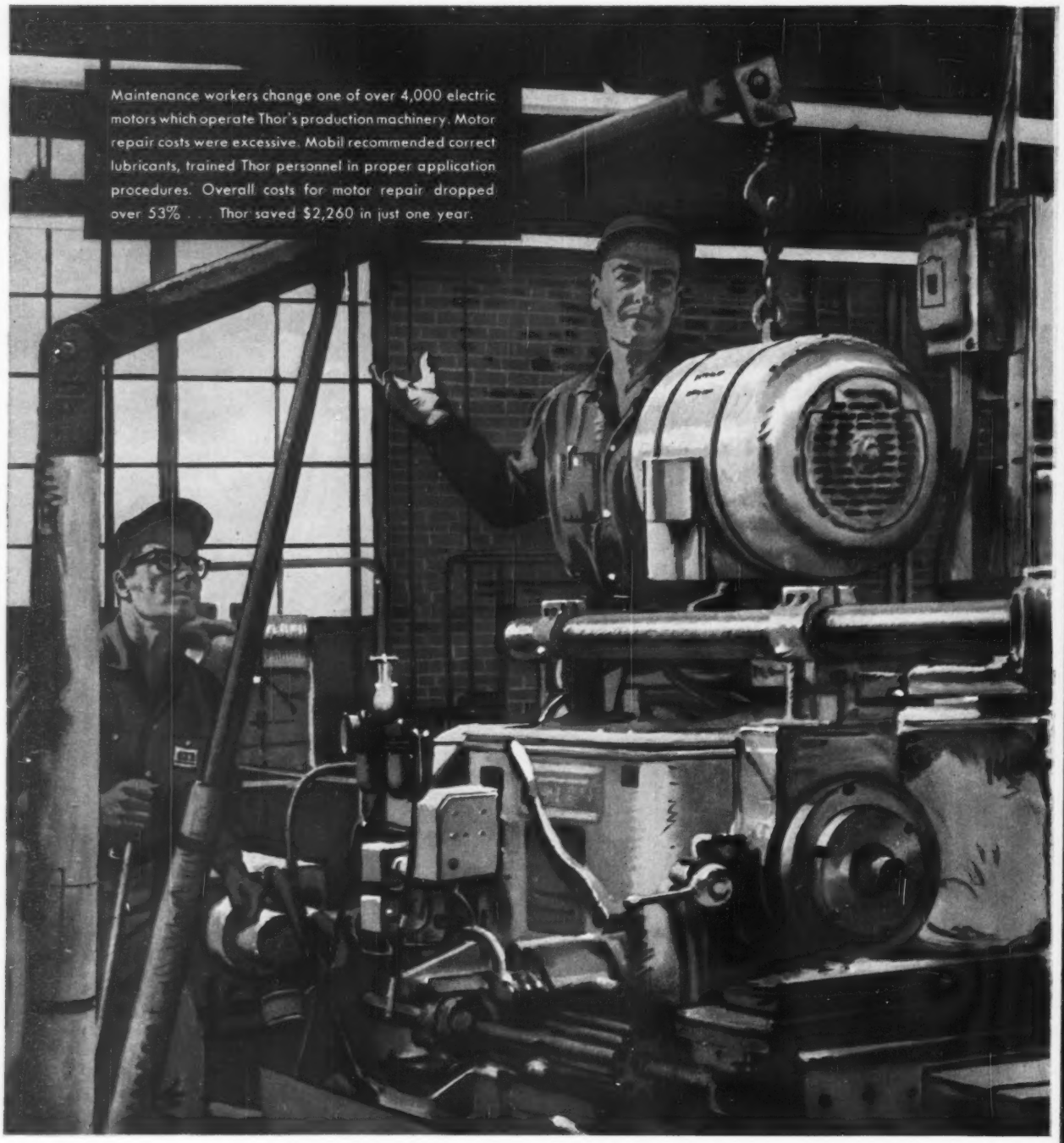
PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

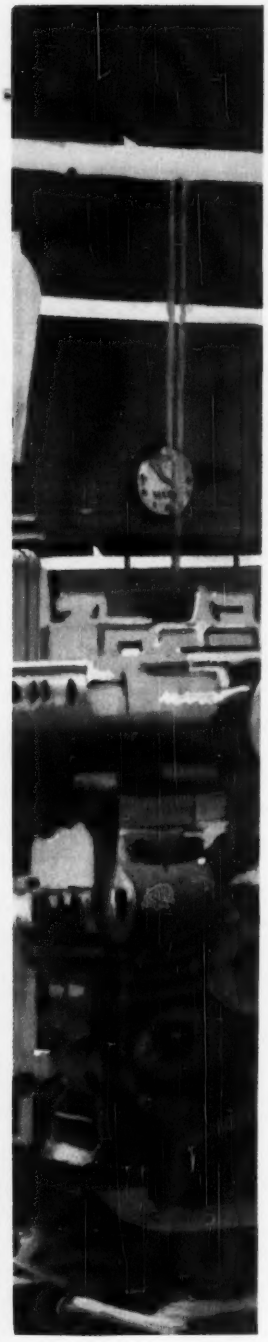
Serving industry from plants located in the United States, Canada, England, Germany and Italy

Thor relies on Mobil


Maintenance workers change one of over 4,000 electric motors which operate Thor's production machinery. Motor repair costs were excessive. Mobil recommended correct lubricants, trained Thor personnel in proper application procedures. Overall costs for motor repair dropped over 53% . . . Thor saved $2,260 in just one year.

Mobil Correct

Program-saves $15,403!



Thor Power Tool Company boosts production and efficiency, cuts maintenance costs and repair time—with a Mobil Program

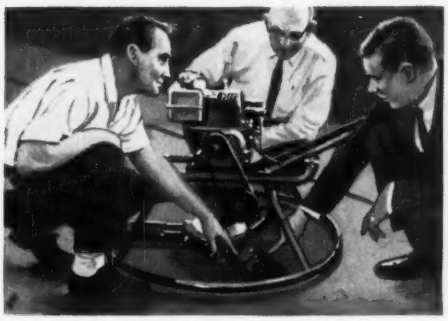
Modern production methods and maintenance techniques helped Thor Power Tool become one of the world's largest manufacturers of industrial equipment operated by air, electricity and gasoline. To keep maintenance efficient, Thor relies on a Mobil Program of Correct Lubrication. Mobil has helped Thor in these ways:

- Establishing exact lubrication recommendations for all plant equipment.
- Training personnel in proper maintenance methods.
- Installing improved application procedures.
- Reducing costly production problems.
- Contributing to Thor product design improvement with regard to lubrication.

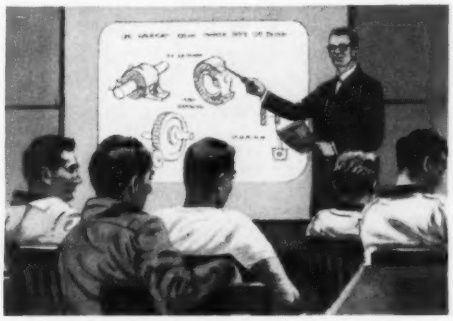
As a direct result of the Mobil program, Thor has increased production efficiency . . . cut maintenance costs . . . saved $15,403 in just one year.

For information on how the Mobil Program can help you, call your Mobil representative or write Mobil Oil Co., 150 East 42nd St., N.Y. 17, N.Y.

MOBIL OIL COMPANY
150 East 42nd Street, New York 17, N. Y.

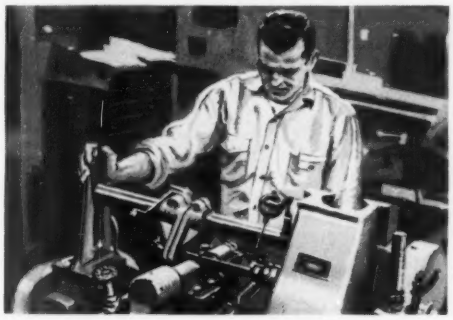


Mobil engineering service contributes to product design improvement. When Thor's Power Trowel developed an annoying lubrication "bug," obstructing featured "finger-tip blade adjustment," Mobil's suggestion and superior grease eliminated problem.



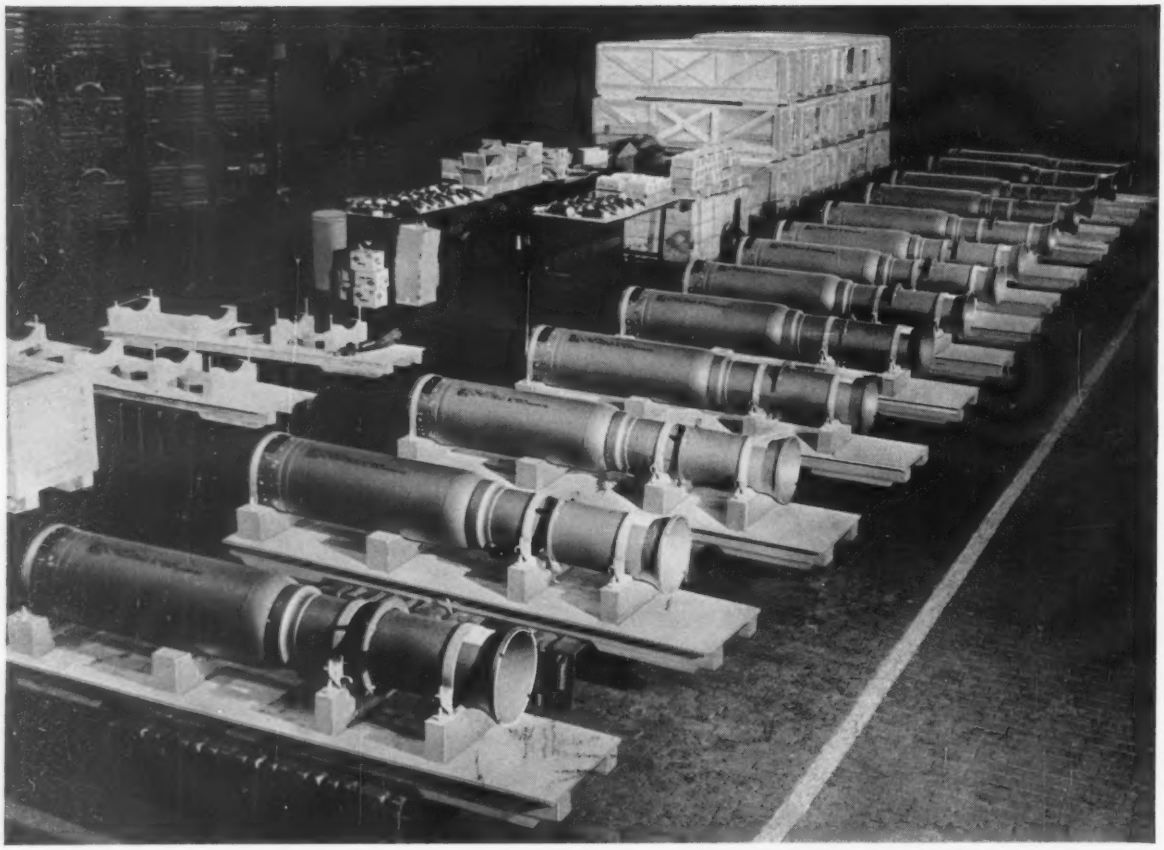
Lubrication clinics conducted by Mobil engineers and a simplified system of product application increased maintenance efficiency materially, permitting reassignment of personnel. Thor saved $4,656 in one year alone.

Slip-stick problems on 3 of Thor's grinders caused downtime and labor loss of four hours a day. Mobil representatives studied the situation . . . recommended a lubricant that solved the problem. Thor saved $1,428 within six months.



On Thor's gear-cutting machines, hobs required frequent sharpening, causing high replacement rate. Mobil recommended cutting oil that prolonged hob life, reduced labor and sharpening costs. Savings to Thor: $7,059 per year.

Lubrication



Part of a shipment of XM10E1 rocket motor metal parts assemblies manufactured by Parish for the Army's Lacrosse missile, a vital weapon in America's arsenal.

PARISH Helps Mass-Produce Missiles to Protect America!

Building *motor metal parts assemblies* for the U.S. Army's Lacrosse missile—being produced by Martin Company—calls for the capacity to produce in quantities a high precision mechanism of the most rigid specifications—so the job went to Parish.

To insure reliability and accuracy . . . to enable the missile—while traveling at fantastic speeds—to hit a target, the motor metal parts assembly cannot vary more than ¼ of 1% of design weight. It must be perfectly balanced and all parts must be completely interchangeable.

Parish has the diversified facilities, the tools and experienced personnel to produce these ultra precision assemblies in substantial volume. If you have a production problem that fits this pattern, write to us. We can help.

PARISH PRESSED STEEL

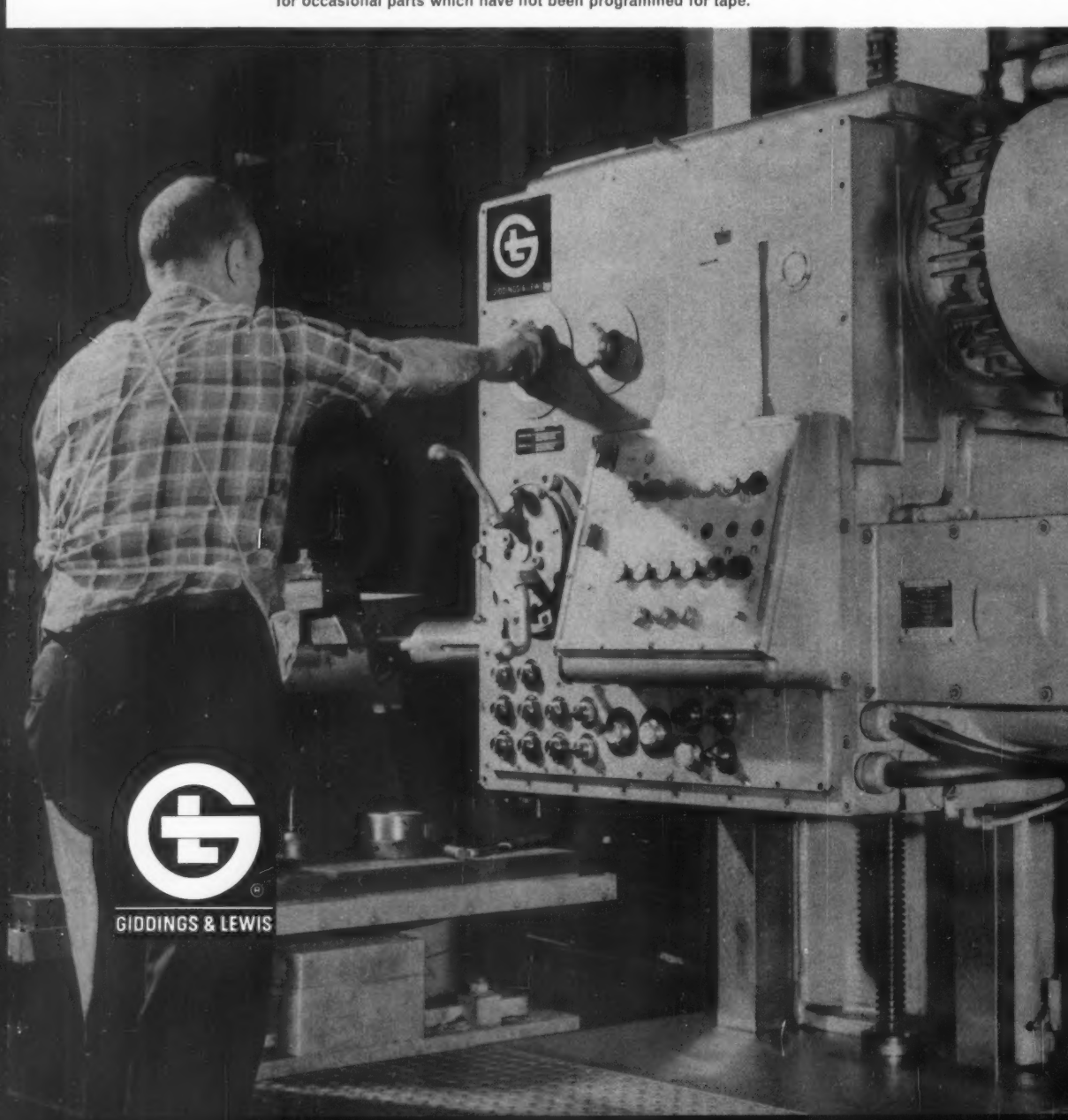
DANA Division of Dana Corporation / Reading, Penna.

● **DANA PRODUCTS:** Transmissions ● Universal Joints ● Propeller Shafts ● Axles ● Torque Converters ● Gear Boxes ● Power Take-Offs ● Power Take-off Joints ● Rail Car Drives ● Railway Generator Drives ● Stampings ● Spicer and Auburn Clutches ● Parish Frames ● Forgings.

MACHINE TOOL BUILDER CHALKS UP $44
SAVINGS IN A YEAR WITH GIDDINGS & L
NUMERIPOINT*-CONTROLLED HORIZONTAL

**TAPE CONTROL PROVES IDEAL FOR SHORT-LOT PRODUCTION — MACHINING TIME SAV
25 TO 50% AND HIGHER — ACCURACIES ARE IMPROVED — TOOLING SAVINGS ARE**

Brown & Sharpe are machining to accuracies of ± .00025" with this Numeripoint-controlled horizontal. T
simply changes tools. A digital dial control system also enables the operator to position the machine with
for occasional parts which have not been programmed for tape.



$44,954

LEWIS

L

SAVINGS RUN

ARE MAJOR

tal. The operator
with pushbuttons

Any manufacturer producing machinery in lot sizes too small to justify full-scale mass production approaches can visualize the values of tape-controlled machining through the experience of Brown & Sharpe Mfg. Co., Providence, Rhode Island.

During a year of operation of its G&L tape-controlled horizontal, this precision machine tool builder experienced machining time savings of $8,594 on the parts illustrated at the right. On the same parts tooling savings were $36,000.

Payoff period only four years. According to the Brown & Sharpe group pictured on the front of this folder, results have substantially exceeded the machine justification. Complete pay-off in only four years is expected.

They also report that programming has been readily mastered. No special skills or capabilities have been required; a knowledge of part layout and job setup is all that is necessary to prepare data. Programming and preparation of tapes for many jobs can be done within several hours.

Tons of jigs eliminated. Economic justification for the Numeripoint-controlled G&L was an open and shut case when Brown & Sharpe faced the cost of tooling for production of a new line of machines. It quickly was determined that the tons of jigs and fixtures required could be "traded" for the new tape-controlled machine. Added advantages of tape: greatly reduced lead time, freedom to modify design almost at will because of the moderate cost involved, reduced handling, lower unit production cost, improved accuracy, and reduction in human error.

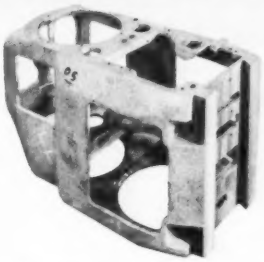
Giddings & Lewis tape-controlled machine tools in use today are providing competitive advantage for manufacturers of power generation equipment, printing presses, construction machinery, machine tools, transportation equipment, aircraft, valve specialties, dies, and other products.

Ask for details. The benefits of tape control are proved and ready for your company. For complete information and cost analysis, consult your local G&L distributor or write:

GIDDINGS & LEWIS

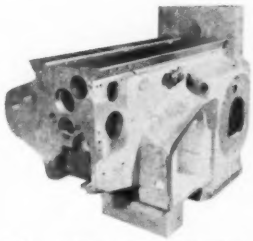
Giddings & Lewis Machine Tool Company, Fond du Lac, Wis.

* Numeripoint is the G&L trade-mark for its punched tape discrete positioning system.

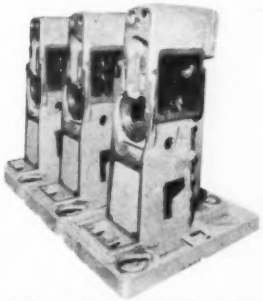


40% time savings in machining heads for turret drilling machines.

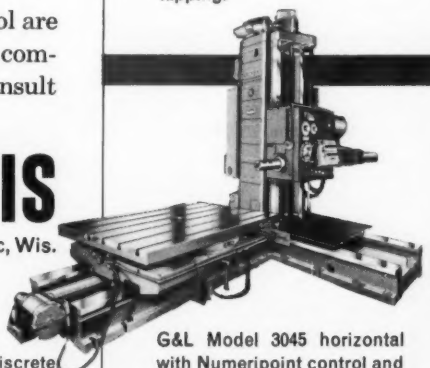
28% savings in unit hours on this upper column for turret drilling machines.



42% savings in production time on this milling machine knee principally through reduction in handling.



50% savings in production time on these milling machine stands — milling, rough and finish boring, drilling, and tapping.

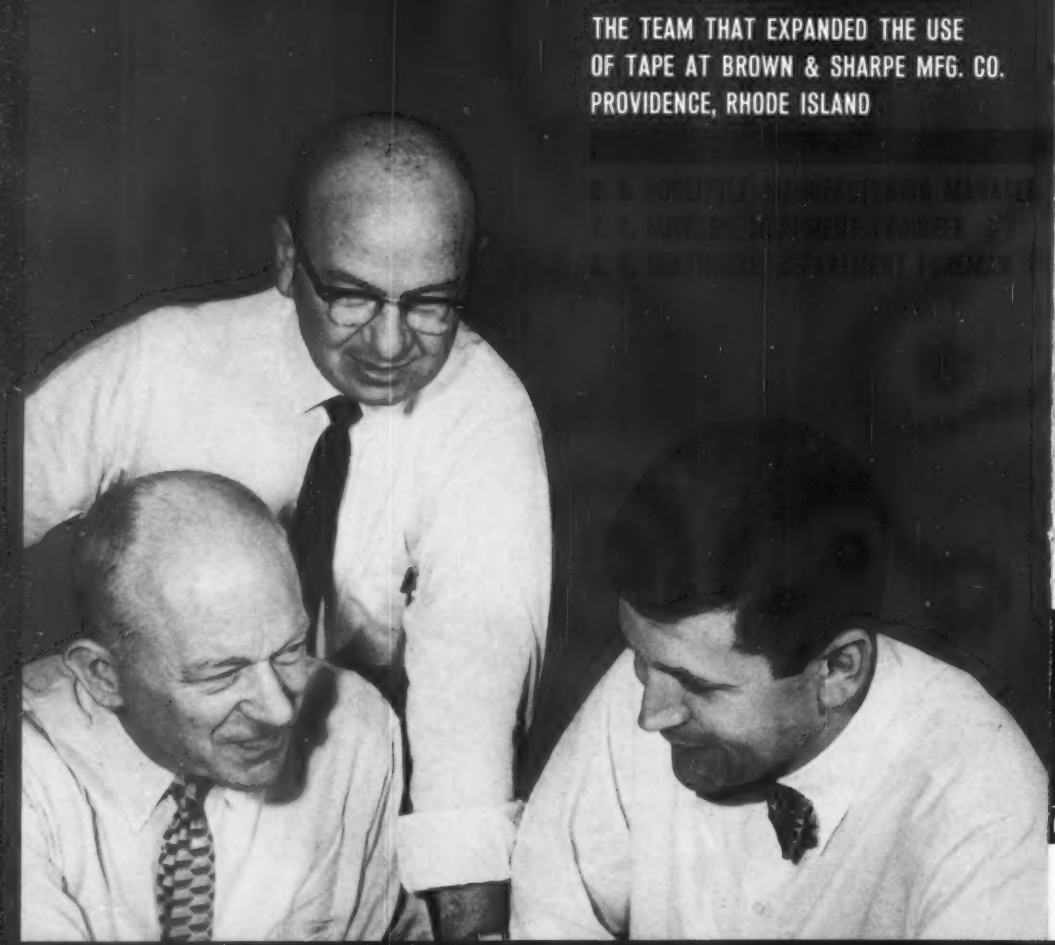


G&L Model 3045 horizontal with Numeripoint control and rotary table.

HOW GIDDINGS & LEWIS NUMERIPOINT CONTROL CHANGES
THE ECONOMICS OF SHORT-RUN PRODUCTION AT BROWN & SHARPE

JIGS & FIXTURES "TRADED" FOR GIDDINGS & LEWIS TAPE-CONTROLLED MACHINING... EXPECT PAY-OFF IN FOUR YEARS

THE TEAM THAT EXPANDED THE USE
OF TAPE AT BROWN & SHARPE MFG. CO.
PROVIDENCE, RHODE ISLAND



GIDDINGS & LEWIS

*G&L Trade-mark

GIDD

TO MEE
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of milling feeds
other exclusive
Ask for Catalo

Table type
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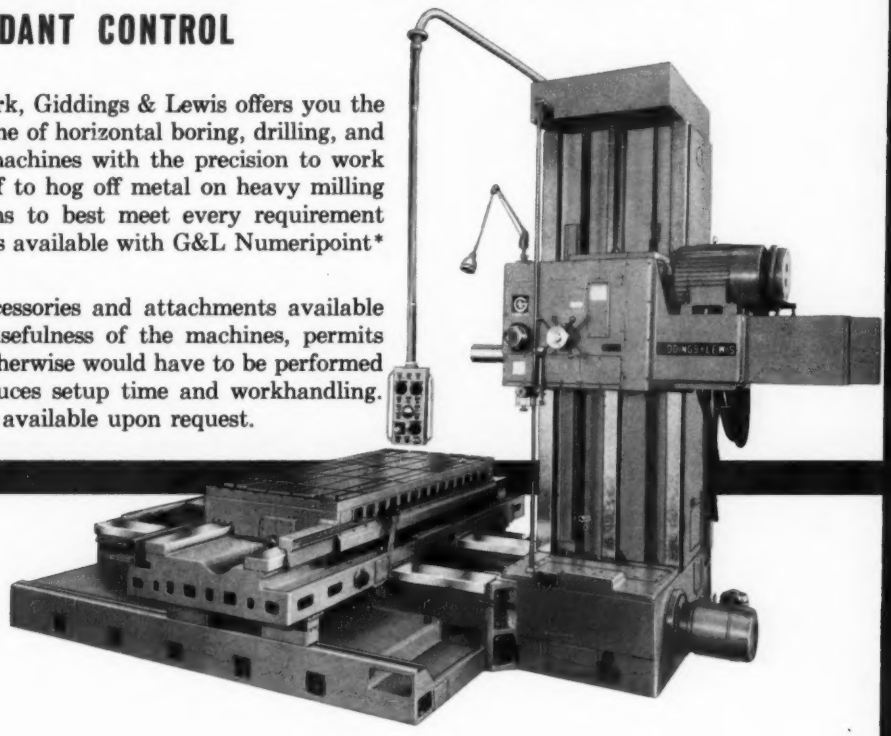
DDINGS & LEWIS HORIZONTALS

IEET EVERY MANUFACTURING REQUIREMENT NUMERIPOINT* OR ERIPATH* TAPE CONTROL . . . TRACER . . . DIGITAL DIAL CONTROL USHBUTTON PENDANT CONTROL

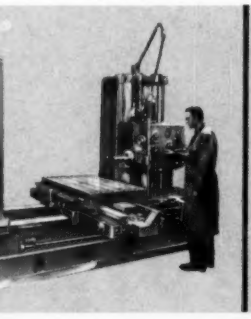
oduction or toolroom work, Giddings & Lewis offers you the xtensive and advanced line of horizontal boring, drilling, and machines available — machines with the precision to work e tolerances and the beef to hog off metal on heavy milling There are control systems to best meet every requirement ery machine in the line is available with G&L Numeripoint* neripath* control.

ost extensive line of accessories and attachments available extends the range of usefulness of the machines, permits ing of operations that otherwise would have to be performed erent machines, and reduces setup time and workhandling. ete descriptive literature available upon request.

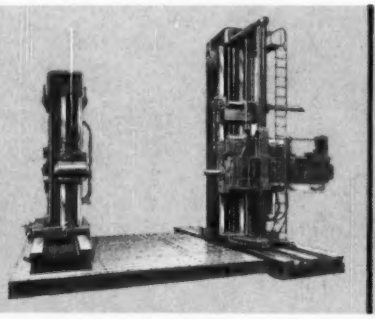


ew G&L horizontal, with 5" or 6" spindle, in- ll pendant control chine functions, 3-way column, motor- lstock, joy-stick control feeds, many lusive features. Catalog No. H6T.

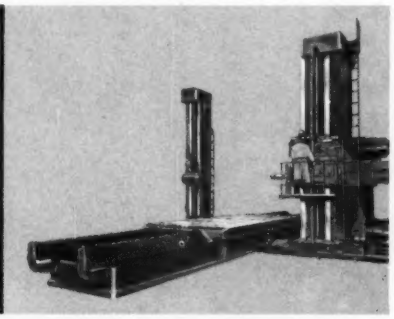
type — 3 to 8" spindle diam- 10 to 75-hp main drives.



Floor type — 4 to 14" spindle diameters — 20 to 150-hp main drives.



Planer type — 4 to 14" spindle diameters — 20 to 150-hp main drives.



GIDDINGS & LEWIS

GIDDINGS & LEWIS MACHINE TOOL COMPANY, Fond du Lac, Wis.

Jig borer and milling machine; horizontal boring, drilling, and milling machines; vertical turret lathes; vertical boring mills; positioning tables; die sinking machines; contour milling machines; radial and upright drilling machines; planers; planer mills; numerical and tracer control systems; Davis boring tools.

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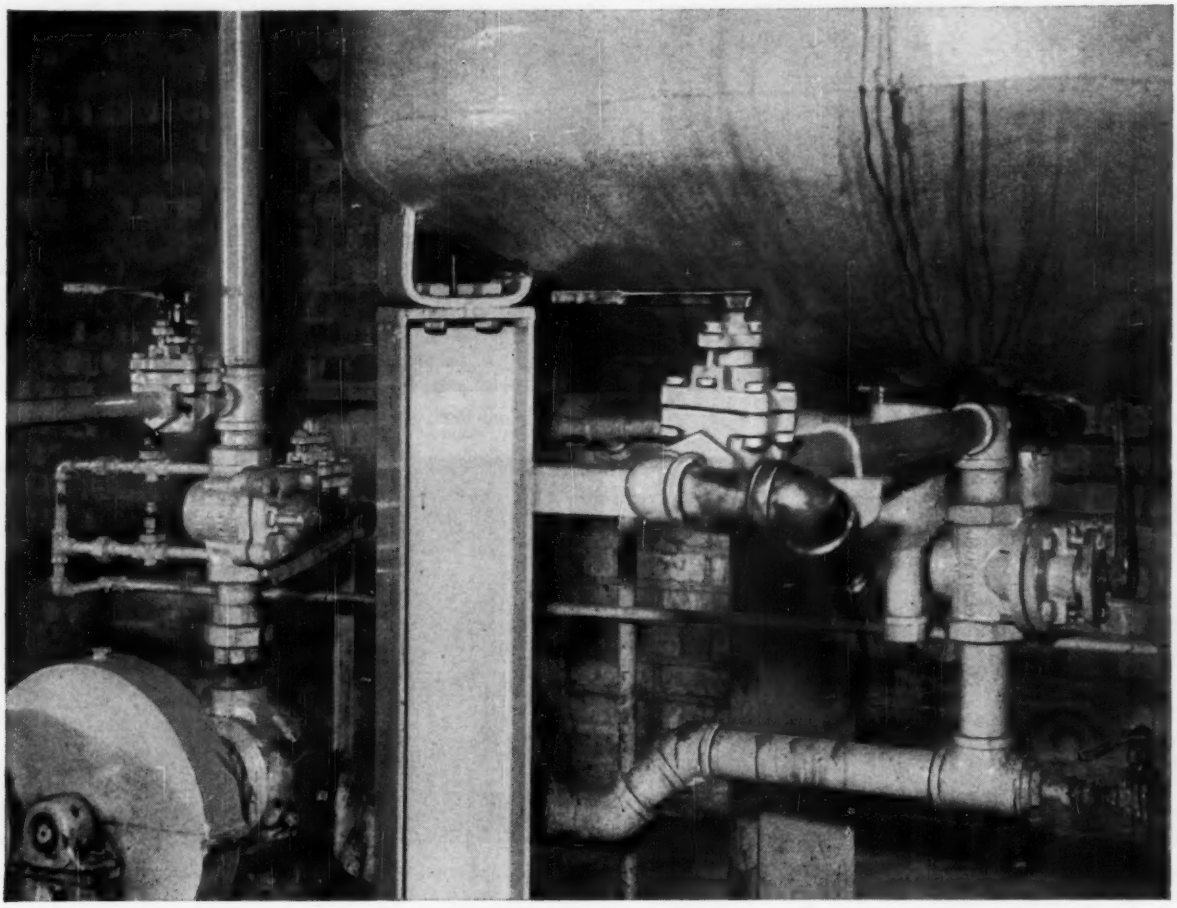
POSITIVE FLUID CONTROL AT LOWER COST PER YEAR is yours with Homestead® Cam-Seald Quarter-Turn Valves. The Homestead CAM is the key to the simplicity and effectiveness of these valves. The cam



limits full operation to a quarter-turn and automatically provides drop-tight shut-off by pressing tapered plug firmly into the valve body. This cam also holds plug and body in close contact for added protection of sealing surfaces. When you specify Homestead, you get longer valve life and dependable, low-cost-per-year service . . . proved by over sixty-eight years in all types of industry. Mail coupon for complete information.

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"Serving since 1892"
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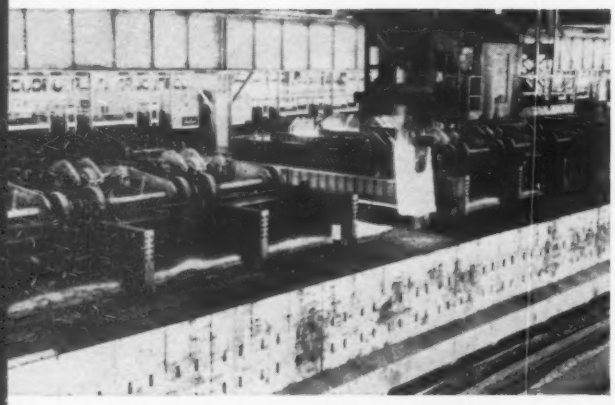
Please send Reference Book 39-2 and prices on all types of Homestead Cam-Seald Valves. 98

Name.....Title.....

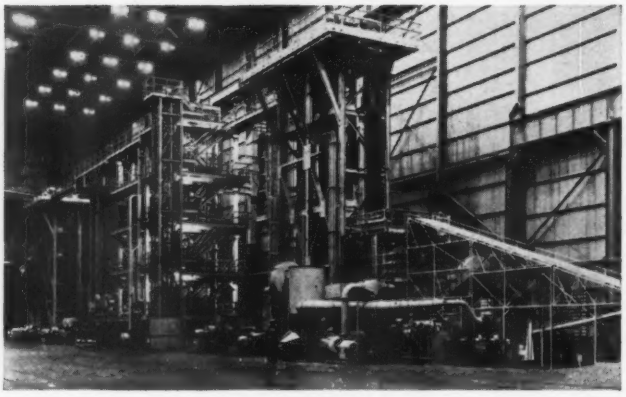
Company.....

Address.....

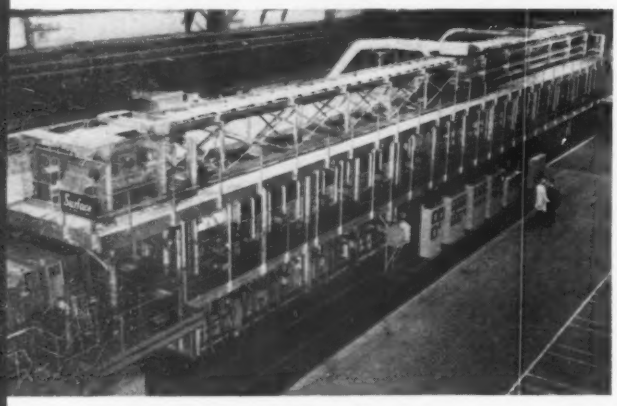
City.....Zone....State.....



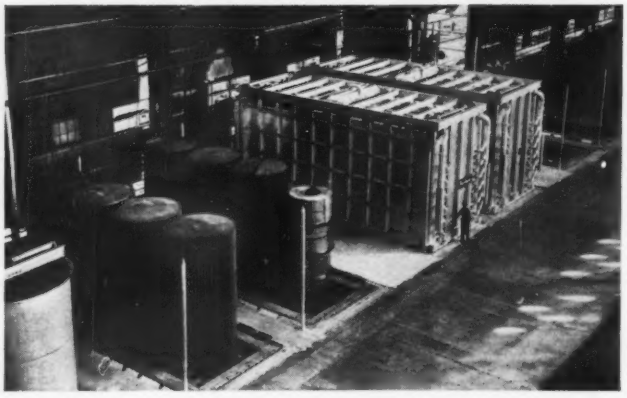
48 soaking pits installed at one time.



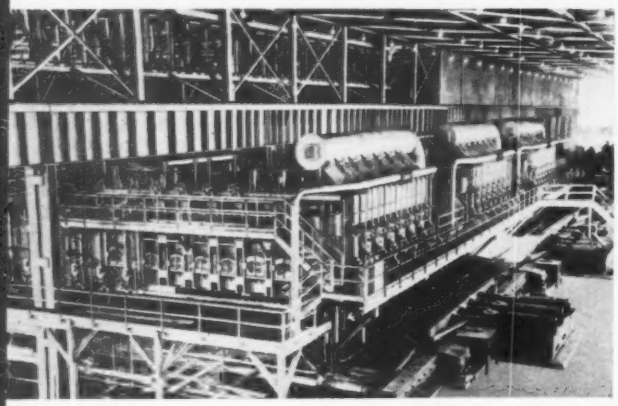
Continuous tin plate annealing line.



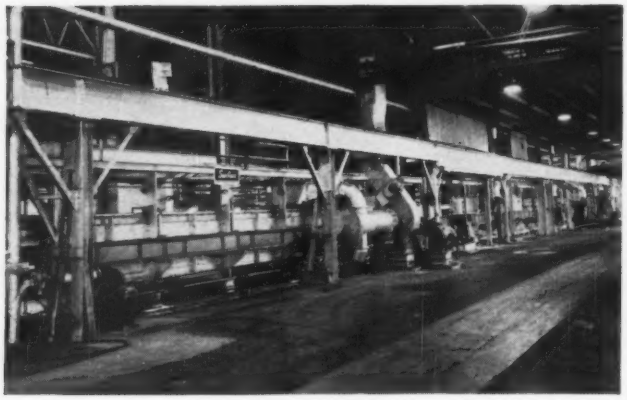
Normalizing line for enameling strip.



Multiple-stand annealing covers.



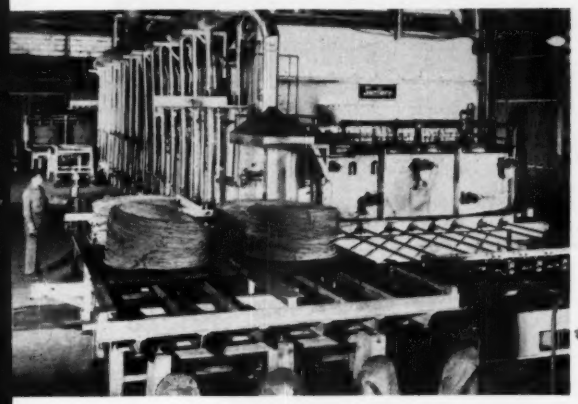
World's largest slab-heating furnaces.



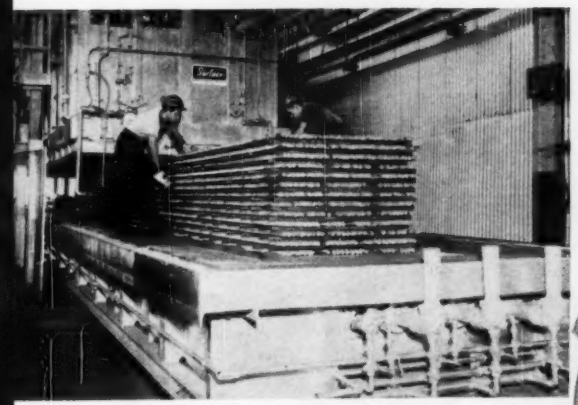
Continuous strip galvanizing line.

Worldwide engineering and manufacturing facilities through associates in Australia

Single-stand radiant tube annealers.



Annealing, carbon restoration furnace.



Car-bottom rod and bar furnace.

PROVING GROUNDS

for steel profits

Surface Combustion's proving grounds—a few of which are shown at the left—include virtually every rolling mill in North America plus a considerable number abroad.

You can sample here the variety of Surface equipment which has passed the toughest tests on the steel mill floor: checked out for quality, shaken down for reliability, and—most important to you—proved out for profitability.

With internal costs and external competition on the rise, it will pay you more than ever before to specify the services and equipment of a company which has repeatedly passed the tests in steelmaking's ultimate proving grounds. Surface Combustion, 2408 Dorr Street, Toledo 1, Ohio.

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Weldments handled efficiently with Load Lifter® Electric Hoists

Load Lifter Series "700" Wire Rope Electric Hoists. ½ to 15 tons. Fast, heavy-duty hoists with two automatic brakes and safe 24-volts at the push-button control. Two-speed models for spotting fragile loads safely. Lug suspension and push, hand-geared and motor-driven trolleys available. Hi-hook model increases length of lift.

Load Lifter Series "600" Wire Rope Electric Hoists. ½ and 1 ton. Low headroom construction. Tough, light-weight hoists that speed production processes. Separate load and motor brakes act simultaneously. Single and two-speed models with 24-volt push-button stations. Lug or hook suspension; push and motor-driven trolleys available.

60 F-1

Bird Machine Company, South Walpole, Mass., engineers and manufactures a large number and variety of special machinery for the pulp and paper and the chemical process industries.

Weldments up to 20 tons are part of some of the machinery. A battery of Load Lifter Electric Hoists solves the problem of handling them efficiently and safely. Suspended from swinging jib cranes in the modern welding shop, each hoist can serve several work stations. They can also transfer units station-to-station for precise positioning and welding.

The different weights, shapes and sizes of the weldments for Bird Machine products make Load Lifter Electric Hoists the ideal choice. They are fast hoists operated by push-button. Two brakes assure quick action for accurate spotting. And, the wire rope load line solves the problem of making nominal side lifts safely.

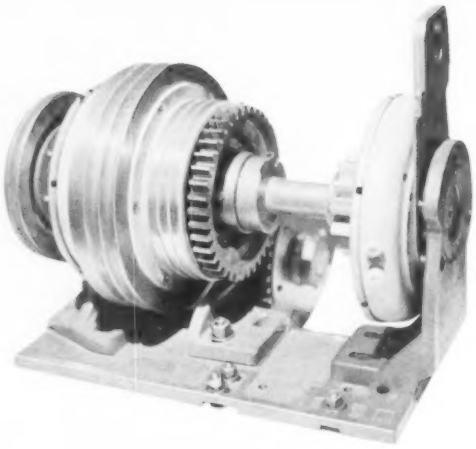
Phone your nearby Shaw-Box Distributor for complete facts about Load Lifter Electric Hoists. Or write for Bulletin 15025-1C.

LOAD LIFTER ELECTRIC HOISTS

A product of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd. • Galt, Ontario



Crompton & Knowles pioneers highly controlled weaving with Warner electric brakes and clutches

Imagination and Warner electric motion cont
can produce major technical achievements, ev
in the highly advanced textile industry.

Crompton & Knowles Corporation, Worc
ter, Mass., proved it by turning a simple el
tromagnetic drive into a versatile control s
tem for their new C-7 loom. Repeat ord
evidence the importance of the developme
benefits of which are impossible to duplicate
a practical manner with any other type of dri

1. *Pushbutton control*—Direct conversion
electrical signals into mechanical motion giv
fast, easy pushbutton stop, start, backup
single-pick operation.

2. *Foolproof interlocking*—Prepositioned
tary switch prevents braking in an unsafe p
tion of the weaving cycle.

3. *Cushioned operation*—Electric protecti
provides time for softer stops, prevents jarri
the machine out of "fix."

4. *Increased work assignments*—Pushbutt
control reduces fatigue and shortens st
intervals, leaving operator more time f
weaving.

5. *Reduced maintenance*—Fewer critical pa
of adjustment. All mechanical protection pa
and linkages are eliminated.

6. *Fail-safe operation*—Precocked brake sto
loom safely in event of power failure.

7. *Reduced skill requirements*—Inexperienc
weavers can operate the loom safely at hig
est speeds.

Albert Palmer, Vice President and Director of Engineering —The big advantage is sensing electrically and controlling directly through an electromagnetic drive.

Fred Paul, Electrical Engineer—Capacitor in the control circuit for overexcitation and fail-safe operation of the brake.

Warren of Warn

Victor Sepavich, Manager, Research and Development (left)—Designs increase productivity of **average** mill workers.

WARNER ELECTRIC

8. Improved operation—Flywheel effect provides steadier operation, especially picking.

Shuttle speed determines how fast you can operate a loom. This makes it difficult to design a machine which justifies replacement of existing equipment. Total mill operating costs must be understood and considered.

The problem is stated well by Mr. W. C. Howe, Northern Sales Manager, when he says mill operators today cannot afford to be in a *marginal* position. Foreign competition is one of the reasons textile mills want the best machines they can get.

The same philosophy is echoed in engineering. Mr. Robert Schedin, Chief Engineer, points to the importance of *intangibles*—factors that don't show up in replacement formulas. He explains that anything which disturbs the balance of the operation restricts the number of looms one person can handle. And they must play a part in product planning.

With these criteria in mind, Victor Sepavich, Manager, Research and Development, planned the electromagnetic drive around two unique control objectives—both important *extra* advantages from an otherwise conventional application of Warner electric brakes and clutches:

Prepositioned control prevents unsafe braking

When a loom stops in the wrong part of its cycle, the shuttle can be thrown into free flight and "smash" through woven fabric, causing long downtime of the machine. By using a prepositioned rotary switch it is possible to actuate the brake only during the safe portion of the weaving cycle. The drive stops the loom in from 40 to 60 milliseconds.

For the same reason, a power failure can be a costly nuisance to a mill. Protection against this nuisance is provided by a capacitor in the C-7 control circuit. This stores enough energy to operate the brake *independently* in the *safe* portion of the cycle. In normal operation, it is used for overexcitation of the brake magnet, making possible 5 to 10 millisecond actuation.

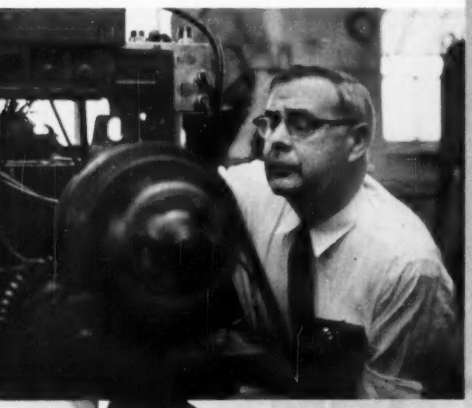
Textile machine buyers look at controls first, so why not put proved performance where your customers see it?

Electric motion control by Warner is pioneering important new concepts in machine design. Direct electrical actuation makes it easy to control: synchronization of multiple drives; fast, automatic cycling; fine-increment inching and jogging; no-load starting; rotary and linear positioning; and other complex functions your customers look at closely when buying capital equipment. Your Warner sales engineer can demonstrate these features right on your desk top.

WARNER ELECTRIC

Warner Electric Brake & Clutch Co.
Beloit, Wisconsin

arren Snow, Manager Quality Control—100% inspection Warner units on a test stand simulating loom conditions.



Joseph Benoit and E. W. Malbon, Purchasing—Warner's facilities and "know-how" pinpoint precisely our production schedules.

Robert Schedin, Chief Engineer—New control is "protective motion." Soft stops help keep loom in adjustment.

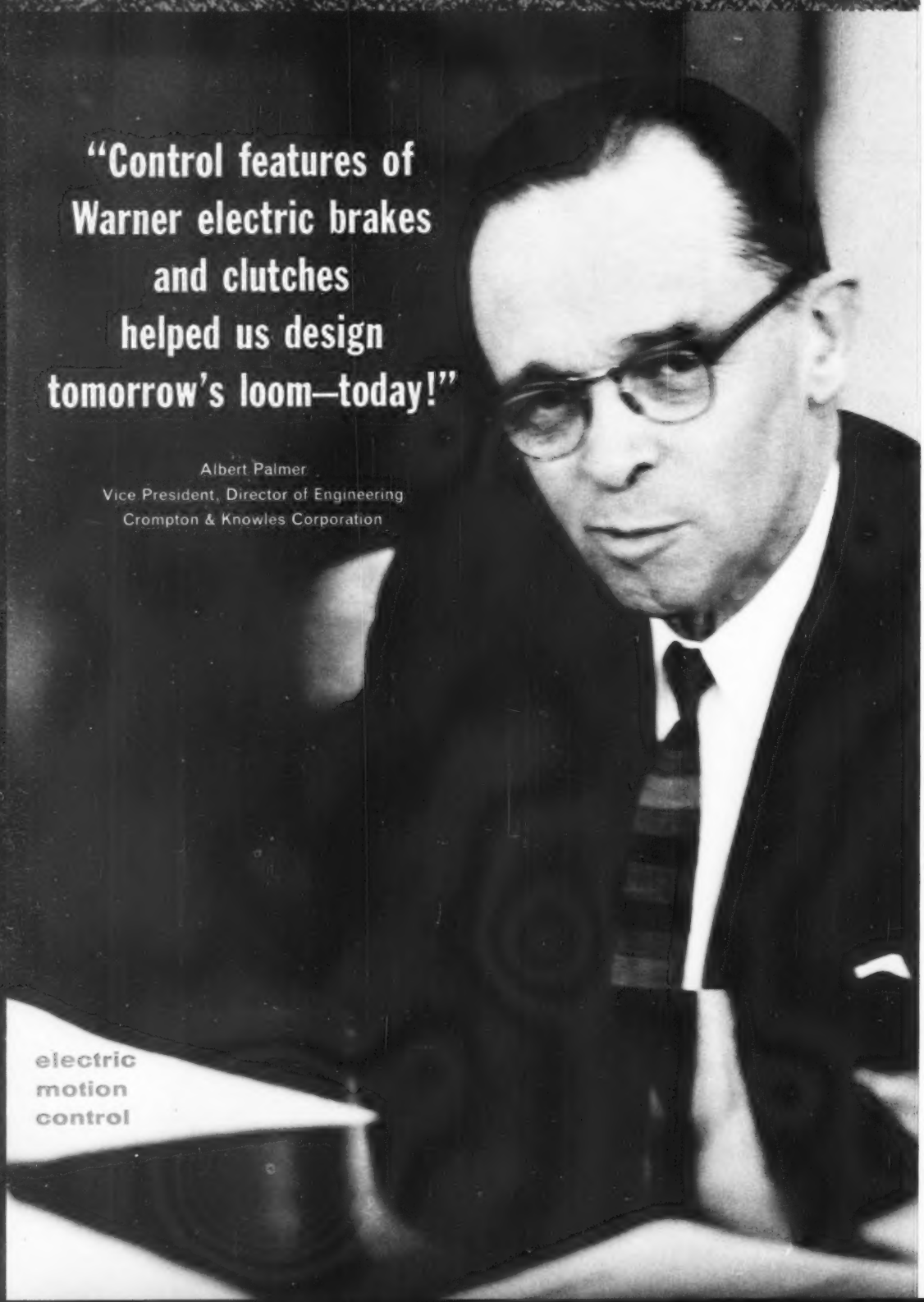
W. C. Howe and H. F. Smith, Sales—Electric brake and clutch features are key to ability of C-7 loom to pay for itself.

Product Improvement Ideas from

WARNER ELECTRIC

"Control features of Warner electric brakes and clutches helped us design tomorrow's loom—today!"

Albert Palmer
Vice President, Director of Engineering
Crompton & Knowles Corporation



electric
motion
control

oasting

he cat and the fox were walking through the woods together. "Man seems to want me ery much," boasted the fox. "Sometimes many men on horses and many dogs come after e, but I fool them with a hundred different tricks. They don't catch me!" // "That's all ery well for you," said the cat, "but when I'm in danger the one thing I can do is run up tree." // "I don't see how you are still alive," said the fox. "I'll teach you some of the any different ways I know of staying safe." // Just then they heard the cry of the dogs. he cat ran up a tree as fast as she could and hid among the leaves. The dogs chased the x through the woods. He tried to fool them with each of his very best tricks, but soon he rew tired and the dogs drew closer. At last the dogs jumped on the poor fox and killed im. // Then the cat climbed down out of the tree and went safely home.

noral: One solution to a problem is good enough, f it's the right solution.

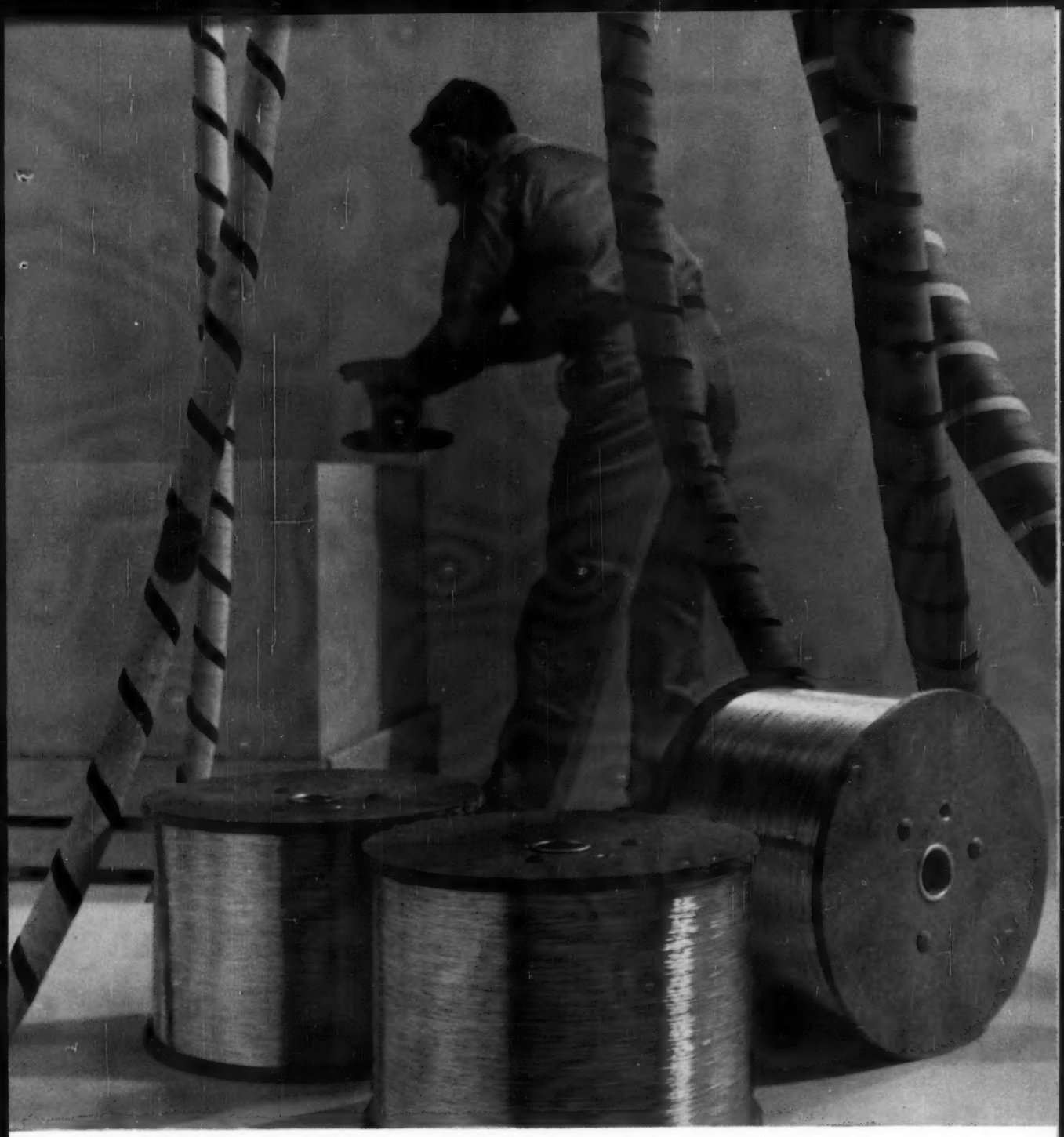
e hope machine downtime isn't your problem, but it does ppen. And when inadequate cylinders are the cause, *one* lution is good enough. Sure, we're talking about Hydro-Line—e source of cylinders for hydraulic applications up to 5,000 , and air operations up to 200 psi.

andard stock cylinders usually will be your right solution . . . y have all catalog stock dimensions, cost 10% less than custom cylinders, and are delivered quickly from stock. If modified designs are needed, we have as wide a range of modified standard cylinders as is available.

Look in *Sweet's Product Design File* (Bulletin 8a/Hy) for standard dimensions of stock cylinders and the address of your nearest Hydro-Line representative. Then ask him for the right solution to your cylinder requirements.

HYDRO-LINE CYLINDERS

5600 PIKE ROAD • ROCKFORD, ILLINOIS manufacturers of:
high- and low-pressure hydraulic cylinders • heavy-duty air cylinders • adjustable-stroke cylinders • dispensing cylinders • intensifiers • single-acting cylinders • booster cylinders



Roebling Hose Reinforcing Wire... The best things come in no-charge packages

When you buy Roebling Hose Reinforcing Wire it is delivered to you on no-charge spools that mean savings to you.

This modern method of packaging does away completely with deposits and the bookkeeping involved; it contributes, too, to lower freight costs and saves storage space. Thus, you avail yourself of a precision-made and quality controlled product, without any handling, shipping and inventory inconveniences.

Roebling Hose Reinforcing Wire, used for braiding reinforcement, is produced in a complete range of sizes. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for details.

Roebling . . . Your Product is better for it

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

Flash butt-welding titanium extruded section eliminates 38 lbs. of material...plus machining

When an extruded shape closely approximates the finished cross-section of a circular part, you can save money—particularly where expensive materials are involved. This titanium ring was circular formed and flash butt-welded from the section shown above. Material savings were $262.00 per ring, plus $46.00 on machining.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and complete machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

Commies to Build Metalworking Plants in Cuba?

Stories being brought back from behind the Iron and Bamboo Curtains by pro-Castro Cubans may be propaganda, but they worry some Americans. One Cuban official speaks of contracts for 56 factories to be built in Cuba by Soviet Bloc nations. Their worth: Some $92 million. Among products he says would be made: Wire cable, gasoline pumps, hardware, motors, textiles. Later on, he says, there will come "a huge steel industry."

Kennecott's Cox Sees Good Export Business

"Our domestic properties are operating seven days a week, and we expect them to continue to do so for the balance of this year," C. R. Cox, president, Kennecott Copper Corp., asserts. He expects good business in Europe for the rest of the year, while noting "some interruption" in the supply of copper from the Congo, which accounts for 9 per cent of Free World production. Kennecott's foreign shipments during the first half totaled 113,600 tons vs. 106,500 tons in the like 1959 period.

Here's Outlook for Six Industries

Here's how the Commerce Department assesses the business outlook for six industries: **Nickel**—1960 consumption to hit 255 million lb (vs. 227.5 million last year). **Magnesium**—1960 consumption, at 51,000 tons, would about equal that of 1959. **Communications equipment**—Domestic sales will hit a record $2.9 billion. **Textile machinery**—Production will be 17 to 20 per cent above last year's $400 million mark. **Material handling equipment**—A 6 to 8 per cent sales decline from the 1959 level is anticipated, though a second half upturn is possible. **Copper**—Expect a 5 per cent drop in demand for copper-base mill and foundry products in '60 vs. '59.

Roger Blough Expects Gradual Improvement

Roger M. Blough, chairman, U. S. Steel Corp., believes the steel operating rate will get "progressively, but modestly, better." He looks for ingot operations to average in the mid-50s this quarter, 65 to 70 per cent in the fourth quarter. Orders and shipments are coming into balance, with the dip in consumer inventories nearly on bottom. He estimates consumer stocks dropped 2.7 million tons in the second quarter to 15 million or 16 million tons, and he looks for them to dip to 13 million or 14 million early this month. From now on, he thinks the trend will be upward, as consumers need stocks of about 16 million tons to be comfortable. He believes steel imports this year will be 3.5 million to 4 million tons, exports less than 3 million tons.

Pittsburgh Steel's Incentive Pay Cut Proposal Hits Snag

The possibility of a new strike loomed at Pittsburgh Steel Co. at the middle of last week. Union locals of the United Steelworkers didn't readily accept

the compromise plan worked out by company and USW representatives. The plan: Reduce the incentive pay of all workers (23 per cent) earning more than 50 per cent above their base pay. Presumably, the union international has recommended acceptance of the plan—details of which haven't been revealed. When some of the locals balked, Pittsburgh Steel announced that if the compromise wasn't accepted, it would put its original proposal into effect. Under it, the reduction would be made over a two year period. Under the contract signed in January, the union can strike on five days' notice after receiving the company's notification. When STEEL went to press, the union was conducting meetings and polling the members about what to do.

Cresap Foresees Appliance Innovations

Mark W. Cresap Jr., president, Westinghouse Electric Corp., forecasts these new appliances: Flat screen television; individual brightness control for all home lighting; a closet in which clothes are cleaned and pressed electronically; portable, noiseless, cordless appliances; a serving buffet that will refrigerate food and beverages, warm rolls and plates, dispense liquids, and dispose of food wastes.

Output Abroad to Leap in Decade

Look for the nations of the Free World to attain at least a 50 per cent increase in production and a 20 per cent gain in population by 1970, McCann-Erickson Inc. predicts in "The Decade of Incentive," a new study. Here are increases in national output predicted for 1970: Canada—60%, Latin America—43%, Argentina, Brazil, and Chile—41%, Mexico—100%, Western Europe—70%, European Common Market—85%, Japan 100%.

Why We Need a Space Communications System

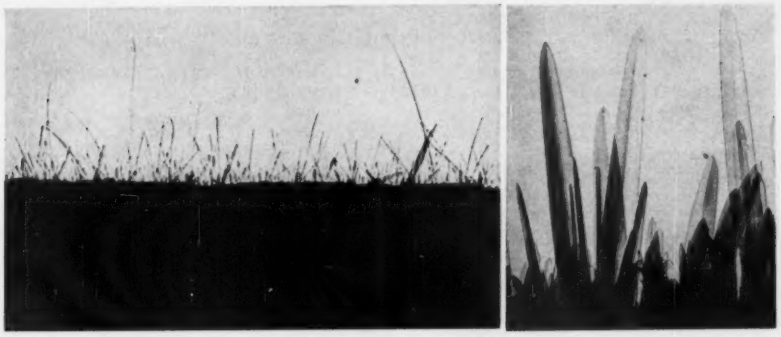
Frederick R. Kappel, president, American Telephone & Telegraph Co., points out why we need new methods of transoceanic communications—by bouncing signals off satellites, for example. People in the U. S. make about 275 million telephone calls daily on 71 million telephones. There are 113 million phones in the world. Between New York and Chicago, there are more than 2600 long distance channels, 850 between Los Angeles and New York. But there are only 57 circuits between the U. S. and England, 21 to France, 19 to Germany, 8 to Italy, 40 to Central and South America, 43 to Hawaii, 8 to Japan, 2 to Australia. With a growing need for rapid intercontinental communications, more circuits must be opened. One method, being tried by Bell Labs, is to bounce radio signals off balloon satellites.

How Industries Are Faring

June net new orders of metalcutting machine tools totaled $43.2 million—up $5.25 million from May, while June orders for metalforming types about matched the May pace, the National Machine Tool Builders' Association reports . . . Construction contracts in June climbed to the highest level this

year—an index of 272 (1947-49=100) vs. 244 in May, F. W. Dodge Corp. says . . . June bookings by the fabricated structural steel industry held close to the May pace, but were off 8 per cent from the year-earlier mark, the American Institute of Steel Construction reports . . . June housing starts declined slightly to a seasonally adjusted annual rate of 1,316,000, says the Commerce Department.

New Theory: Hydrogen Is Real Culprit in Corrosion



Two Westinghouse scientists suggest that hydrogen ions penetrate iron and enlarge the sites at which oxygen combines with the metal. Photo at left shows corrosion in a dry oxygen atmosphere; at right (photo at same magnification) is corrosion in a pure water vapor atmosphere (see Page 93).

Appliance Makers Cut Prices to Trim Inventories

Frigidaire Div., General Motors Corp., has boosted sales allowances to dealers by enough to trim wholesale refrigerator prices $6 to $40. Ten days earlier, General Electric Co. cut wholesale prices on four models by $10 to $30. Westinghouse Electric Corp. says it will remain competitive. Object of reductions: Unload heavy stocks at both factory and retail levels.

Look What's Being Done Thermoelectrically

Robert Jensen, executive vice president, Materials Electronic Products Corp., Trenton, N. J., drinks water cooled thermoelectrically. Other applications for thermoelectricity that the firm says are practical today: Small volume refrigerators for homes, autos, boats, planes, and camping; military air conditioning and freezing; temperature control in chemical and metallurgical processes, electronics, communications; cooling of transistors, infrared cells, rectifiers, diodes, photocathodes, photomultipliers, and other devices.

Another Ore Source Set in Canada

Can-Fer Mines Ltd., Toronto, says tests "have proved conclusively" that at least 130 million tons of magnetic iron formation can be recovered from its Western Ontario properties. Harry Isaacs, president, says early testing "produced a premium grade concentrate of 69 per cent iron and 3.7 per cent silica,

with a magnetic iron recovery of 86.7 per cent. A second test yielded a concentrate analyzing 67 per cent iron, with recovery of 96.5 per cent of the magnetic iron." The property is on the main line of the Canadian National Railway, 185 miles from Lake Superior docks.

Leisure Market: Sounds, Slices, Snaps, Casts Spell Growth

Americans will spend $43 billion for recreation this year—vs. $41 billion last year and $30 billion seven years ago, predict economists at Tri-Continental Corp. They estimate 1959 expenditures this way (in billions of dollars):

Recreation & domestic travel	16.8	Photography	2.1
Radios, TVs, phonographs	5.0	Bowling	1.0
Fishing	2.6	Hunting	1.0
Spectator amusements	2.2	Golf	0.7
Boating	2.1	Swimming pools	0.06

Business Indicator Declining

The volume of classified, help wanted advertising in U. S. newspapers is a business indicator worth watching. The National Industrial Conference Board, which keeps an index of the ad volume, reports that it has fallen nearly to the pre-steel-strike level.

Brazil to Have Steel Mill in 1962

Piacaguera, in the state of Sao Paulo, Brazil, is the site of a steel mill to begin operation in 1962. Initial capacity: 600,000 tons of sheets and plates annually. Companhia Siderurgica Paulista is building the mill; Westinghouse Electric Corp. will supply $22 million worth of electrical drives, motors, and controls.

Straws in the Wind

SKF Industries Inc., Philadelphia, will give its 289 U. S. distributors access to staff specialists, including men in insurance, taxation, personnel, and promotion . . . American Steel & Wire banked a second blast furnace in Cleveland last week . . . Corporate cash dividends paid in June were up 4 per cent from a year earlier.

Metalworking Pulse

The Business Trend: STEEL's industrial production index continued its postholiday recovery by advancing 4 points during the week ended July 23. The trend line will hold near this level for the next week or two. **Autos:** Ford's attempt to make up for strike losses is sustaining over-all output despite model changeover shutdowns elsewhere. **Steel:** Producers are taking advantage of slow demand to make extensive repairs and give employees vacations.

- **INDUSTRIAL PRODUCTION**
  - Week ended July 23 .... 152†
  - Year ago 121
  - Details on Page 69
- **PASSENGER CAR PRODUCTION**
  - Week ended July 30 . 111,000*
  - Year ago 122,518
  - Details on Page 66
- **INGOT PRODUCTION RATE**
  - Week ended July 31 . 53.8%†
  - Week ago 54.4%
  - Details on Page 112

†Preliminary. *Estimated.

Copyright 1960 by STEEL, Penton Building, Cleveland 13, Ohio

From a laboratory furnace to a reverberatory furnace Hevi-Duty helps you find the value solution to your non-ferrous melting problems

Hevi-Duty's value solutions to three melting problems are described below. Such solutions call for comprehensive industrial engineering ability as proved by Hevi-Duty's success in solving thousands of heat processing problems in all types of applications.

Such solutions call for creative design engineering ability backed by Hevi-Duty's experience with industry's most complete line of electric and fuel-fired furnaces and ovens. (Where stock designs or adaptations won't do, Hevi-Duty custom-engineers equipment including huge field-erected furnaces.)

Such solutions call for soundly built and tested equipment typified by Hevi-Duty furnaces now paying off throughout industry in increased production and extended economic life of equipment.

Case histories by the hundreds testify that it makes profitable sense to call in your Hevi-Duty sales engineer to help find the value solution to your melting problems.

HEVI-DUTY

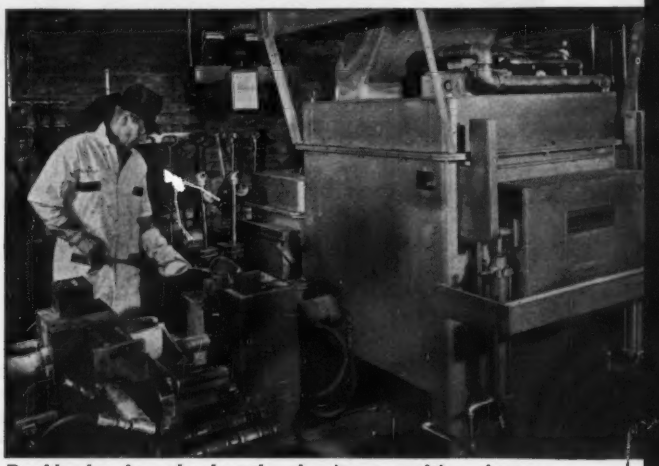
Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C

A Division of Basic Products Corporation

Hevi-Duty Electric Company, Milwaukee 1, Wis.

Hevi-Duty G-05 laboratory furnace used by Great Lakes Steel Corp., Detroit, for determining alumina content of slag is kept at 2200°F, 24 hours a day, 7 days a week. It heats rapidly, has 48 steps of control between 1700°F and 2600°F. Instruments and controls in base remain close to room temperature. **For more information please request Bulletin 254.**



Double-chamber dry-hearth aluminum melting furnace covers only 32 sq. ft. area at In-Sink-Erator Co., Racine, Wis., yet melts and holds up to 400 pounds of aluminum per hour after 2½-hour warm up. Well insulated furnace permits use of a permanent mold machine next to the dip-out chamber. **For complete information write for Bulletin 593.**

Each of these reverberatory furnaces melt and hold 35,000 lbs. of aluminum for direct-chill billet casting. One furnace brings melt up to temperature while other pours. Large doors permit easy bath access for charging, drossing, fluxing, alloying and furnace cleaning. **Please write for Bulletin 591.**

THIS TAG on your brite wire coils is your badge of wireworking efficiency

Are You a Brite Wire Fabricator?

Your first LPR will prove how much time and money you save with Long Production Run Coils

FACTS OF WIREWORKING

The smaller your bundles, the more of them you use in every job run. The oftener you change coils, let alone the coincidental set-up adjustments you make, the more machine time you lose and the more coil-remnant scrap you generate—

In a nut shell:

LPR's MINIMIZE DOWNTIME AND COIL REMNANT SCRAP . . . THE NO. 1 PROFIT PIRATES IN WIREWORKING

At the right, you'll read reports of the experiences of brite wire fabricators who switched to Long Production Run LPR's from conventional bundles that weighed from 150 to 400 pounds. (We'll gladly document.)

USER EXPERIENCES

- Downtime frequency due to coil changes and set-up adjustments reduced as much as 95%
- Unloading time alone cut as much as 82%
- Productivity increased from 20% to 33⅓%
- Scrap loss slashed in direct ratio to coil changes avoided
- Man-hour costs trimmed 20% and more
- High density, self-supporting coils reduced storage space by 20% to 50%
- Inventory management greatly improved
- Returnable-carrier problem and small coil racks eliminated.

YET LPR's COST NO MORE THAN COMPARABLE BRITE WIRE IN SMALL COILS

Care for further proof . . . or a demonstration? For quick action please call your nearest DSC Customer "Rep" Office or write: Detroit Steel Corporation, Box 7508, Detroit 9, Mich.

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

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Performance Proved DSC® Steel

DETROIT STEEL

Flat Rolled and Wire Products

Counterattack

A lot of readers are writing this editorial.

Ever since this publication started to point up the threat of foreign competition to U. S. metalworking and indicate some steps to counteract it, we have been receiving many ideas from industrial managers.

Some grumble. Some are pessimistic. Some want to retreat behind tariff barriers and import restrictions.

Others recognize that a new battle line has developed. They believe it must be met positively. They think our salvation lies in equalizing the terms of competition and in offsetting the big advantages overseas competitors have in wage rates.

They suggest to industry:

- **Sell employees on the urgency of the problem and on the necessity for remaining competitive to preserve jobs for Americans.**

Three companies that are publicizing the threat of foreign competition to their workers have been able to eliminate labor contract provisions which hindered efficiency. They cut out featherbedding. Two have renegotiated contracts to eliminate costly premium wage provisions. Another says that after foreign competition was explained to workers productivity rose sharply without any formal action.

- **Take full advantage of American industry's superior management skills.**

Through better management, U. S. productivity per manhour is higher than that of other countries. Labor costs more per hour, but we get more for it. By still better application of management skills and through greater utilization of labor saving equipment, our correspondents contend that further substantial progress can be made.

- **Apply our marketing skills aggressively and imaginatively.**

However imperfect we may think our marketing, it still is better than that of our competitors. Our experience in achieving the world's highest standard of living puts us in the position of "having seen the movie before." We can know what is coming in the new markets abroad. We can better anticipate their needs and be ready to meet them.

No correspondent pretends to have a complete answer. Those suggesting courses of action for industry also believe government must show political courage in adjusting our tax burdens, in getting realistic on depreciation practices, in freeing industry from restrictions that put us at a disadvantage in what promises to be a battle for economic survival.

They say: We can counterattack, but we can't do our best until both hands are untied!

Walter J. Campbell

EDITOR

. . . Stacks of Nestaway racks show nesting, interlocking and space-saving features of racks for baked goods handling made by Mid-West Metallic Products for its affiliate, Nestaway, Inc. Rack held by Harold W. Vetter (left), Mid-West director of manufacturing, and Robert J. Adams, purchasing agent, holds 12 loaves of bread and stacks 12 high on castered base. Rack uses up to 13.3 pounds of Pittsburgh Steel Co.'s bright basic wire.

DELIVERING BREAD—BY WIRE

Pittsburgh Steel wire's uniform welding, forming properties give Mid-West Metallic extraordinary success in the manufacture of Nestaway racks

Bread and pastries are delivered better by wire. That is, by welded steel wire racks that perform double duty in handling and selling baked goods.

Mid-West Metallic Products, Inc., a fast-growing subsidiary of Rubbermaid, Inc., uses Pittsburgh Steel Company's bright basic wire to build wire shipping racks for its affiliate, Nestaway, Inc., another Rubbermaid subsidiary. In addition to the Nestaway racks, Mid-West makes more than 300 other wire formed products, using Pittsburgh Steel's bright basic and galvanized wire in a wide range of sizes.

The Nestaway racks, however, are a prime example of Mid-West's experience in using Pittsburgh Steel's .3625 and .3065 bright basic wire.

The racks are part of a complete Nestaway system for baked goods handling to and at the point of sale. The system includes interlocking wire racks, rack shelves and caster bases. It eliminates nearly all direct handling of baked goods between bakery and consumer.

To build the Nestaway racks, Mid-West uses automated and semi-automated forming and welding equipment of its own design. This equipment requires wire with the highest possible uniform physical properties. Mid-West depends on Pittsburgh Steel for much of its wire supply because it is assured consistent, uniform quality.

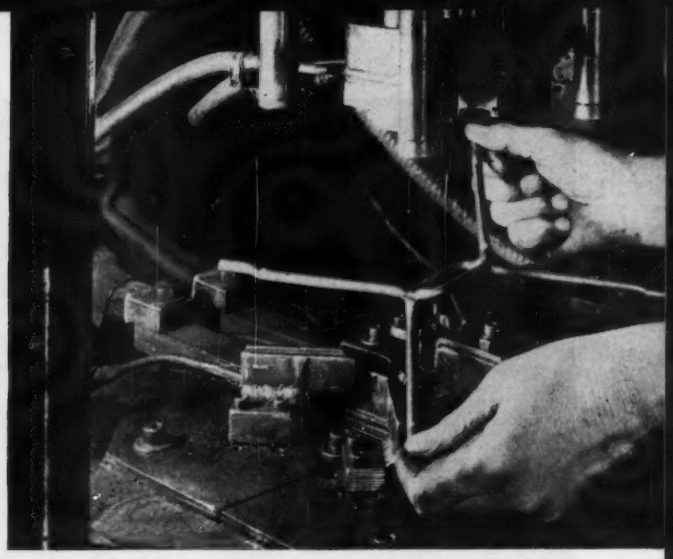
• **Phenomenal Welding Success**—Made in 11 sizes ranging from 8.4 to 13.3 pounds in weight, an average Nestaway rack requires 200 welds.

On welding, Harold W. Vetter, Mid-West's director of manufacturing, says:

"In all of our production last year, we had an extraordinarily low number of broken welds. We've had racks returned that had been accidentally crushed by trucks—but the welds were seldom broken."

Purchasing Agent Robert J. Adams adds further evidence of the

. . . From straightening and cutting through final copper-nickel-hard chrome plating, Pittsburgh Steel's wire meets Mid-West Metallic's requirements for consistent uniformity of forming, welding, coating properties.



. . . Key piece of rugged Nestaway rack—the bends and welds on "X"-shaped side supports are produced to tolerances of plus/minus .015 inch by Mid-West Metallic with Pittsburgh Steel's .3625 bright basic wire.

weldability of Pittsburgh Steel's bright basic wire, saying:

"We found Pittsburgh Steel wire would consistently hold welds when we bend the welded ends of the rack's bottom frame to form Nestaway's interlocking feature."

• **Close Forming Tolerances**—Because Nestaway racks are built to stack when loaded and nest precisely when empty, wire bends are made to unusually close tolerances. Mr. Vetter explains:

"This rack is so accurately formed that it's practically a machined product. Every bend—even over-all dimensions and some welds—is held to a tolerance of .015 inch."

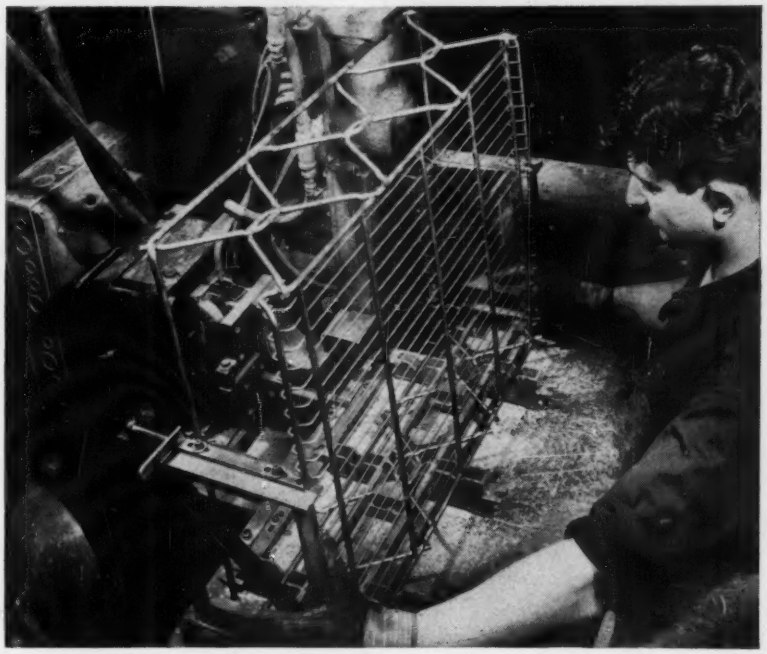
Surface finish of Pittsburgh Steel's wire is vital, too. After assembly, the rack is given a copper-nickel-hard chrome coating to provide a durable, attractive unit which meets strict standards of cleanliness.

Pittsburgh Steel's ability to supply wire with the consistent quality Mid-West Metallic requires is testified to by Purchasing Agent Adams. He says:

"Pittsburgh Steel furnishes us quality wire with uniform properties from shipment to shipment. Otherwise, we're in trouble on our automatic machines. We want wire that is weldable, formable and clean.

"Pittsburgh Steel has been able to give us what we want with consistency and we're extremely satisfied with the way its wire performs for us."

Take a lesson from Mid-West Metallic's experience. The benefits this progressive company gets from using Pittsburgh Steel's wire can be yours, too, whatever your application. Just contact one of the district offices listed at the right.



. . . With 200 welds per rack and a present capacity of more than 25,000 Nestaway racks per month plus component parts of the Nestaway System, Mid-West Metallic experiences very few broken welds in the course of a year. Credit goes to efficient equipment and wire quality. Nestaway rack is shown here in assembly before chrome plating. Mid-West, a subsidiary of Rubbermaid, Inc., looks to Pittsburgh Steel for bright basic wire and plain galvanized wire to make Nestaway racks and more than 300 other products at the new Cleveland, Ohio, plant.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

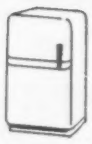
Steel

(Inland "job-tailored" Cold Rolled Sheets)

FORMABILITY

Like the supple bending . . . the creation of new shapes and forms by this highly-trained dancer . . . steel, too, must be endowed with similar ability . . . FORMABILITY. If it is to meet the varied needs of today's manufacturing practices, steel must be produced for ease of fabrication . . . must form dependably without springback or surface disturbances.

FORMABILITY, as a working characteristic, is carefully built into Inland Cold Rolled Sheets. Prime consideration is the use for which the steel is ordered. Inland makes certain it *knows* its customer's requirements . . . works always to satisfy such specific needs.



In Yoder forming and tangent bending of refrigerator wrappers, Inland Cold Rolled Sheets do not flute (panel) or spring back.

Television cabinet wrappers are not marred by surface disturbances even though Inland Sheets are brake press formed on fast assembly lines.

Projection screen cases are produced with Inland Sheets without time-wasting springback and with no fluting to mar attractive appearance.

INLAND

INLAND STEEL

30 West Monroe St., Chicago 3, Ill.

Sales Offices: Chicago • Davenport • Detroit Houston • Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul

PRICE PRESSURES rival those of '58 recession . . .

"Some component makers have tried to push through price boosts but have had to back down."
—DETROIT AUTOMAKER

"Published lists mean nothing. Everything has been up for grabs for the last two months."
—MIDWEST FASTENERMAKER

"Any across-the-board price hikes will hinge on what happens to steel prices later this year."
—MIDWEST FABRICATOR

"We've been taking only regular published discounts—not interested in doing business with chiselers."
—CLEVELAND FIRM

"There has been price cutting in electrical motors in recent months. By taking advantage of these 'discounts' we're saving about 10 per cent on motor costs."
—EASTERN MACHINE TOOL BUILDER

"Price cutting is something we like to read about but not discuss."
—MIDWEST PNEUMATIC EQUIPMENT BUILDER

"Competition's fierce on some parts we buy —smaller firms are ready to make cuts to get an order."
—EASTERN MANUFACTURER

"Prices are definitely soft, but rising labor costs tend to keep them from dipping too much. A buying upturn could bring some upward adjustments."
—EASTERN RADIO-TV MANUFACTURER

Any Easing Could Trigger Some Hikes

"PRESSURE ON PRICES is more intense today than it has been at any time during the last ten years, including the recessions."

That's the way a Midwest purchasing vice president sums up his comments to the question: "What's happening to prices?" Purchasing and sales executives in a half dozen major metalworking centers echo his sentiments, STEEL found in a spot survey of component prices last week.

Weakening prices and price cutting are reported on practically every kind of component metalworkers buy, including fasteners, gears, stampings, castings, forgings, electrical components, motors, and bearings.

• **4th Quarter Hopes**—How long will price cutting continue?

Most of the sales and purchasing managers say they should know in 30 days. Two favorable signs: Inventory paring is about over, and a general business upturn is expected in the fourth quarter.

Observes the purchasing vice president for a lift truck manufacturer: "Our inventory liquidation program has about run its course, and we'll be stepping up our September purchases 15 per cent over what they've been for the last four or five months. If others follow suit, I wouldn't be surprised to see part prices firm up, perhaps even rise a bit."

Most component producers admit there's nothing they'd like to do more than get profits back up to "normal" by eliminating price cutting and possibly increasing some

Eugene G. Grace Dies

EUGENE G. GRACE, who Charles M. Schwab, founder of Bethlehem Steel Corp., once called "the greatest steelman America has ever produced," died at his home in Bethlehem, Pa., last week. He was 83. Mr. Grace was instrumental in guiding Bethlehem to its position as the country's second largest steel producer.

The son of a sea captain turned store owner, Mr. Grace worked his way through Lehigh University, earning an electrical engineering degree with honors. In 1899, he went to work for Bethlehem, receiving $1.80 for a 12 hour workday as an electric crane operator. Within seven years he became general superintendent and in another seven years, he was named president at the age of 36.

Mr. Grace held the presidency until 1945 when he became chairman and continued as chief executive officer. He retired Nov. 1, 1957.

After college, Mr. Grace had an offer to play professional baseball with the Boston Braves, but chose Bethlehem because he felt that a baseball career was short. His success in the steel industry made him one of the country's highest paid corporate officers for many years. In 1929, his salary was $1,560,000. Among his many accomplishments, Mr. Grace served as president of the American Iron & Steel Institute in 1934.

prices. (Machine tool prices will probably rise, see Page 88.) Most are confident that business will turn up in the fourth quarter. The question is how much.

Last week producers got some encouragement when the National Industrial Conference Board released its second half report on the business outlook. Sixty-three per cent of the respondent firms predict that bookings will show an increase over those of the like 1959 period.

Reasons cited for their optimism:

• Some of the looked-for-but-not-received order volume during the first half is believed to have been merely delayed.

• Completion of inventory adjustments (they have particularly hurt primary metal producers) is expected to increase demand. In prospect: Customers will make purchases to meet operating needs.

• New models and new products could stimulate sales of many firms, including aircraft, instruments, office equipment, furniture, and chemicals.

• **What's Behind It**—Three factors are blamed most frequently for generating the current price pressures:

1. Inventory paring—started in the second quarter because business levels didn't measure up to first-of-the-year forecasts. Suppliers have lots of capacity and are trying to keep volume high by settling for lower unit profit.

2. Higher labor costs—experienced by most firms since the first of the year.

3. Foreign competition—via a "hidden" route. It's not a case of foreign vs. U. S. components. End product makers who buy U. S. components are losing sales to foreign products.

The degree of price pressure is shown by the lack of uniformity in "discounts."

Laments an Eastern manufacturer of plumbing goods: "Business is far enough below year ago levels so that price cutting is common. Prices vary not only from day to day but also from job to job!"

A Chicago appliance maker reports he's getting fasteners at 19 per cent below list prices. Adds a fastener maker: "List prices aren't even a good guide. We went into the wringer in 1958 and haven't come out yet."

A Midwest maker of fractional horsepower motors charges that customers, including appliance makers, are beating down suppliers. "Business is better now than it was during '58, but many part prices are below those charged two years ago."

• **Some Exceptions** — A few purchasing executives say they aren't running into much price cutting. The exceptions are noted mainly in the Chicago, Detroit, and Cleveland areas. One large builder of electrical equipment says several suppliers recently tried to push through some modest price increases, but most have had to back down because of competition.

Says a gearmaker: "We've been selling at these prices for a year and half. We can't go any lower; we're just waiting for an opportunity to slip in a price increase."

Steel Foundries Develop New Outlets

SHIPMENTS of steel castings this year may not exceed 1959's total, although they ran 11 per cent higher in the first four months. Chief reasons: Reduced buying by railroads and a general dropoff in other business.

Purchasing habits of railroads traditionally follow the trend in freight carloadings. In the first 27 weeks of 1960, loadings were 4 per cent below 1959's. An increase of 5 per cent had been expected.

• **Seek New Markets**—To offset dependence on a vacillating railroad market, producers of steel castings are finding promising customers in new areas. Bolstered by its diversification, new casting techniques, and metallurgical advances, the industry is wooing buyers in construction machinery, mining and crushing machinery, metalworking machinery, material handling, and power equipment.

Fostering the new approach is the industry's trade association, the Steel Founders' Society of America. The society's active market research and product development committees are stimulating new applications and expanding present ones.

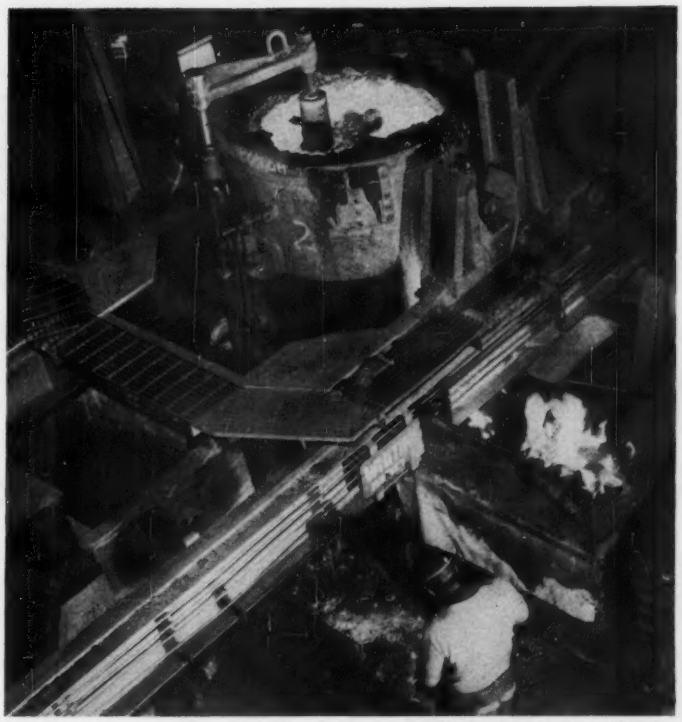
• **New Look in Castings**—F. Kermit Donaldson, executive vice president of the society, points to these developments:

Changes in product mix, toward more complex castings, have been made; and advances in technology have reduced the weight of many castings without reducing strength or service life. Methods: Improved designs which result in reduced metal sections, the use of more low alloy steel castings, and heat treatment to higher strength values. On a pound for pound basis, purchasers now get about 20 per cent higher strength values in castings than they did ten years ago.

In addition, shell and ceramic molding and improvements in green sand molding are producing castings to closer tolerances, which eliminate or reduce machining operations.

Steel castings, offering better strength-weight ratios, are being produced in the ultra-high-strength ranges (200,000 to 300,000 psi).

Small and medium size castings can now be made with dimensional consistency. The trend to higher pressures and temperatures, particularly in the nuclear industry, is stimulating demands for both low and high alloy steels.



American Steel Foundries.

• **Where Steel Castings Go**—Market research studies by the society show that railroads still get about one-fourth of the industry's production. (From 1950 through 1958, they received 24.2 per cent of total tonnages, says the U. S. Bureau of the Census.)

Based on surveys, including 66.4 per cent of the tonnages reported to the Census Bureau, the other major markets are:

Construction machinery	13%
Rolling mill machinery, rolls	10.5%
Oil and gas valves, piping	6%
Military, tanks, missiles	5.5%
Mining, crushing machinery	5%
Special machinery	4.5%
Motor vehicles	4%
Machine tools, presses, etc.	3.5%
Electrical machinery	3%

Rail equipment makers, off to a fast start in the first quarter, faced a sharp production cutback in the second as carriers trimmed their capital outlays.

It is estimated that only 50,000 to 55,000 freight cars will be built in 1960 versus 56,414 in 1959.

Steel Casting Shipments

(Net tons)

*1960	1,400,000
1959	1,412,885
1958	1,121,000
1957	1,766,191
1956	1,931,987
1955	1,530,694
1954	1,184,096

Source: U. S. Bureau of the Census.
*Estimated.

How a

You don't just expand for the sake of expanding. There must be a plan . . .

LOUIS PUTZE, President, Controls Co. of America

PLANNED GROWTH has helped Controls Co. of America develop from a fledgling in the control component and systems industry to third place in five years.

The firm was formed through the merger of Soreng Products Co., Schiller Park, Ill., and A-P Controls Co., Milwaukee, in 1956. Combined sales of the two firms in 1955 reached $23.6 million. Last year, sales of Controls Co. of America topped $51.4 million.

"Our philosophy of growth has been based on two major principles," explains Louis Putze, president.

"First, in acquiring additional companies, we have attempted to round out over-all activities, rather than expanding just for the sake of expanding.

"Second, by designing, developing, and manufacturing complete control systems, rather than producing only components, we have been able to effect savings for our customers and ourselves, sell more products to our customers, and improve our competitive position."

The original merger combined a company making appliance and automotive controls (Soreng Products) and one manufacturing controls for heating, refrigeration, and air conditioning (A-P Controls). Succeeding moves have enabled the firm to penetrate deeper into the original markets and add several new ones, including vending machines, industrial controls, and aircraft and missiles.

• Paralleling growth in product lines, sales, and manufacturing facilities has been the formation of an aggressive management team combining depth, experience, and knowhow.

Roy W. Johnson, former president of A-P Controls, is chairman of the board of Controls Co. Mr. Putze, 43, a Purdue trained engineer, at one time was the youngest president of a Sears, Roebuck & Co. subsidiary. At 29, he headed Sampsel Time Control Co., Spring Valley, Ill. When Sampsel merged with Soreng Mfg. Co. to form Soreng

Fledgling Planned Its Growth

Products, he became president of that company.

Messrs. Johnson and Putze have surrounded themselves with a management team composed of executives from the companies that merged as well as from other sources.

• To maintain a high grade management team, the company has instituted a formalized executive development program that extends to the foreman level.

Each manager is responsible for training his own replacement. In addition, managers at each job level rate the men under their authority on job proficiency, rate of development, and estimate how soon they will be ready to move up.

When such ratings are translated into executive development charts, management has at its fingertips information to guide its consideration of each man's executive capabilities.

• Development of a co-ordinated marketing program among the divisional sales forces has been a major goal of the growing company.

In the organization structure of Controls Co., a division director of sales reports directly to the division general manager.

But co-ordination of the various selling arms is the job of Charles M. Stainton, vice president and director of marketing for the parent firm, who operates on a staff level.

"Emphasis is placed on co-ordination of activities in divisional sales departments to achieve cross fertilization of ideas," declares Mr. Stainton. "The resulting communications flow is extremely helpful in aligning the departments' strong points for sales effectiveness."

The company's marketing approach is closely tied to the systems concept. Sales engineers work with customers to develop the information that leads to complete control systems for appliances, oil and gas furnaces, and other products.

• "Our management believes that major emphasis on research and development is essential for continued growth," points out George D. Becker, vice president, operations.

The engineering of control systems around which company growth was planned has been largely the responsibility of engineering research and development personnel. One device which has come out of the R&D effort is a cycle-set power timer. It provides a complete control system for washers, dryers, and dishwashers. A single button selects an entire cycle.

Another development is the direct spark ignition system which eliminates the traditional pilot light in gas clothes dryers.

Currently, Controls Co. is devoting considerable research and development time on semiconductors. "They have a big future in the appliance and automotive fields," explains Mr. Becker.

Each division maintains its own product research and development activities operating within the engineering department. Normally, the work does not cross division lines. A major exception is the semiconductor research where there will be a lot of cross-divisional engineering between the Electron Div. and the Appliance & Automotive Div.

• In 1956, the company consisted of eight manufacturing plants with total floor space of 565,000 sq ft. Today, Controls Co. has 21 manufacturing plants with floor space of 1,070,000 sq ft.

Mergers, acquisitions, and new plants from 1956 to 1959 brought five other firms into the Controls Co. fold with these products: Permanent magnets, synchronous motors, precision switches, snap switches, oil burners, and special type rotating equipment. The moves expanded and rounded out product lines, put the firm more deeply into defense work, and gave it greater strength in world markets through the export sales of one of the acquired firms.

Late in 1959, Controls Co. organized a new subsidiary, Solid State Electronic Controls in Tempe, Ariz., to manufacture diodes, rectifiers, and other semiconductor devices.

Management feels that "semiconductors may have universal application in the types of controls we are making, and we will be ready when the time comes." Initially, a sizable amount of production will go to the military. This year, the subsidiary was made a division of the company —the Electron Div.

• Controls Co. also has developed a healthy foreign manufacturing activity.

Europe and South America are rapidly growing markets for the kind of home heating and appliance controls the company makes. European headquarters are at Zug. Switzerland; a plant in Holland builds oil burner and certain appliance controls. There are two plants in Canada and partially owned factories in Brazil and Argentina. The number of items made in those countries is steadily increasing.

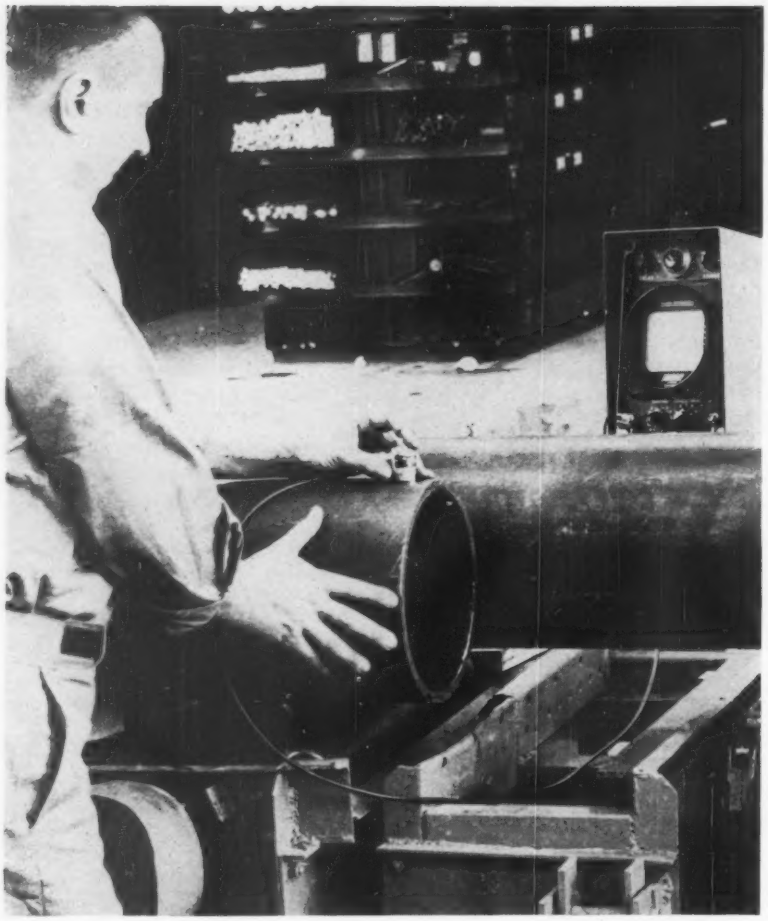
"The future of our foreign operations is excellent," asserts Mr. Putze. "Increased standards of living have created demands for American type appliances and conveniences. We have been expanding our technical staff abroad; a training program for our European sales application engineers was recently completed in the U. S."

• Outlook for 1960: Controls Co. is in a healthy position. Look for continued growth.

It now has the manufacturing facilities, marketing and distribution groups, and a management team to thrive and keep on growing.

Forecasts indicate that internal growth of its present divisions may be substantial in future years. Controls Co. is still interested in acquisitions, but not merely for the sake of getting bigger. Here's what Mr. Putze has in mind:

"The product must fit into the controls field, and must add to the company's over-all sales potential, new lines, customers, and products," concludes the president.



Branson Ultrasonic Corp.

Gaging is high on list of growing applications as . . .

Ultrasonics Branches Out

LOOK FOR ultrasonics to make many new inroads into metalworking technology.

The process is being used in cleaning, flaw detection, welding, machining, measuring, and other applications. It is firmly established in the automotive, aircraft and missile, hardware, electronic, optical, instrument, and metal finishing industries. And it's still going places.

• Ultrasonic cleaning is suited to automated methods, speeding up metalworking processes, and eliminating manual labor. One of the newest markets is the basic steel industry.

At Pangborn Corp., Hagerstown, Md., equipment that cleans up residue left by steel shot in blasting steel strip has been installed by Wean Engineering Co., Warren, Ohio, and Branson Ultrasonic Corp., Stamford, Conn. It replaces flash pickling.

Wean Engineering cites three other areas in the steel mill where ultrasonics has potential: 1. Removing rolling oils from steel. 2. In the rinse tank after pickling to remove pickling smut. 3. In the pickling tank.

Ultrasonic agitation in the pickling tank can cut processing time in half. Production can be doubled by adding ultrasonics to present pickle tanks. New pickling lines need be only half as long as a conventional installation.

Electrolytic cleaning lines are usually followed by rotary scrubbing brushes. It has been suggested that ultrasonics may do a better scrubbing job than mechanical brushes which can't get into the voids. Another possibility is in precleaning of plate before tin is deposited on it.

The rapid generation of ultrasonic energy and violent collapse of minute bubbles in a liquid blasts soils, grease, and oxides off complicated parts and assemblies in seconds. Insoluble solids and contaminants are cleaned out of cracks, undercuts, and blind holes that are inaccessible when other cleaning methods are used.

• The steel industry is also a major market for flaw detection equipment.

Since some of the auto companies have started to ultrasonically inspect cold rolled sheets and set higher standards, some steel mills are considering installing high speed scanning devices that will spot defects at mill speeds. A relatively new technique, column coupling, makes high speed scanning practical. The transducer is coupled to the part by a column of liquid, water or oil, through a special transducer mounting. There is no contact of the transducer with the metal and no wear on the transducer.

Auxiliary devices, such as audible or visible alarms, and marking equipment, such as paint sprays, free the operator from continuously watching a screen.

Ultrasonics has become an established technique for detecting discontinuities of all types—voids, porosity, delamination, cracks, inclusions, layer interfaces, seams, weld imperfections—in all kinds of metals. Ultrasonic flaw detection first proved itself in the aircraft industry.

• Materials considered difficult or impossible to weld with conventional techniques are being joined ultrasonically.

Examples are metals such as aluminum foil, where surface oxidation or welding heat presents a deterrent to standard welders, and metals with high electrical conductivity, such as copper. Gulton Industries Inc., Metuchen, N. J., recently introduced a 10 watt foil welder that

can join aluminum foil as thin as 0.00017 in., magnesium 0.005 in. thick, and molybdenum and nickel 0.0005 in. thick.

• Ultrasonic machining cuts hard materials quickly, economically, and to close dimensional tolerances and surface finishes, says Sheffield Corp., Dayton, Ohio.

Typical materials being machined ultrasonically include hardened tool steels, carbides, ferrites, germanium, silicon, aluminum oxides, and some plastics. Machining operations include drilling single or multiple holes, broaching and shaving, slicing, dicing, and engraving.

Sheffield's Ultrasonic Research Laboratory is studying the effects of high frequency vibrations (ultrasonic energy) on the grinding of high strength, thermal resistant alloys.

In ultrasonic machining, cutting is done by abrasive grains that are driven into the workpiece by the linear oscillation of the tool. The high velocity with which the grit bombards the workpiece machines away microscopic particles without perceptible heat.

• Ultrasonic gages measure the thickness of a material by determining its resonant frequency of vibration—it's inversely proportional to its thickness.

The big advantage to ultrasonic gaging is that it can be done nondestructively from one side of the part. Accuracies are usually within 0.1 per cent of the actual thickness. Higher accuracies can be reached by using recording attachments.

Automatic converters can be used with instruments to stop a machine, sound an alarm, or activate some other warning device when a predetermined size has been reached. Ultrasonic gages are also used in maintenance inspection to determine corrosion damage to tanks, pipelines, boiler tubes, and ship hulls.

Under development at Narda Ultrasonics Corp., Westbury, N. Y., are ultrasonic devices for metering the flow of liquids without putting any obstruction in the stream. Narda feels such devices should find wide usage in controlling the flow rates of cooling liquids in heat exchangers, furnaces, and reactors.

Drinkers Drain Profits

ALCOHOLISM gives business and industry in the U. S. a "billion dollar hangover" annually, it's estimated in a report issued by a Cleveland group.

Other findings:

- Alcoholism is the fourth most serious health problem in the U. S.
- The adult population includes 70 million social drinkers and 4 million problem drinkers.
- About 2 million of the problem drinkers are employed by business and industry.

• Local Level—The report, which was compiled by a committee of the Welfare Federation of Cleveland, states that almost all Cleveland companies have policies on problem drinking.

They use one or a combination of these approaches:

- Get rid of employee.
- Refer employee to Alcoholics Anonymous or have a member of A.A. talk to him.
- Have foreman or supervisor handle the problem.
- Refer employee to doctor.
- Refer employee to personnel department.

• Specifics—Absenteeism and lowered production are reported to be the most common symptoms of the problem drinker. He's generally an hourly paid worker, but salaried personnel are the most seriously affected.

In screening, most employers use several criteria, including medical examinations, past employment, and appearance.

• Aid—These recommendations are offered:

1. Even though most firms have policies covering drinking on the job, more aggressive educational problems are needed to inform management, labor, and the community generally on the latest approaches to identification, treatment, and rehabilitation of problem drinkers.
2. Employers should be encouraged to provide job opportunities to rehabilitated problem drinkers.
3. Employers, unions, and the community should be made more aware of the local agencies organized to help problem drinkers.
4. Prepare and distribute to all firms and community groups information outlining the best approaches to problem drinking.

S.S. DEL RIO, 506 ft, general cargo vessel, was launched last month at the main yard of Avondale Shipyards Inc., New Orleans. She is one of three under construction there for Mississippi Shipping Co.'s Delta line. The three are the first to be ordered under Delta Line's 14-ship replacement program

Tariff Pressures Mount . . . U. S. Budget Surplus Exerts Deflationary Influence . .. Chance for Tax Cuts?

● TARIFF COMMISSION WINS CASE—The President must accept or reject a recommendation of the Tariff Commission for higher tariffs or quotas on imports if it is made under the escape clause of the Trade Act. He can't modify it in any way.

That ruling, handed down from the U. S. Court of Customs & Patent Appeals, is regarded as significant to those fighting to keep domestic industry from becoming unduly harmed by imports. Although the decision involves imports of lightweight bicycles, it could apply to at least three other industries: Lead and zinc, spring clothespins, and stainless steel flatware. In fact, ensuing Supreme Court and Congressional action could vitally affect all U. S. business that's feeling the pinch of foreign competition.

The court approved a lower court's decision. In the industries mentioned, the President weakened Tariff Commission recommendations by ordering only some of the restrictions sought.

● CONGRESS MAY ACT IN '61—The right of the President to modify an order of one of his administrative agencies has been the subject of much discussion in recent years. Last year, certain conservative congressmen sought to make Tariff Commission decisions final, whether or not the President approved them. The court's decision doesn't go that far, of course, but it puts tremendous pressure on the White House to follow commission rulings.

By a two-thirds vote, Congress can overrule the President in favor of the commission in cases where he rejects the commission's recommendations "in whole or in part." The court's decision removes the possibility of rejection in part.

Sources familiar with Trade Act proceedings say the Supreme Court will be reluctant to involve itself in the case. If it refuses to take an appeal on the Customs & Patent Appeals Court decision, then court action can be expected on some of President Eisenhower's recent decisions. Importers will be appealing to get their higher duties removed, and they'll want it done retroactively.

On the other hand, domestic producers will be forced to go to Congress to get Tariff Commission decisions made final. Proceedings could drag on for months. The necessity for Congress to take a firm stand on the issue next year is overwhelming from both the importers' and the domestic producers' points of view.

● DEFLATIONARY INFLUENCE—For a change, the federal government has been exerting a deflationary influence on the economy. The surplus of $1.1 billion for fiscal 1960 indicates that trust funds run by the U. S. operated in the black, or less in the red than usual. For example, receipts into the unemployment trust fund increased faster than employment dropped off; social security receipts were above those forecasted at the beginning of the year; and the highway program was slowed down.

The surplus for the fiscal year just ended compares with the $12.4 billion deficit of fiscal 1959. People in Washington are already talking about President Eisenhower's last budget—the one he will submit to Congress in January for fiscal 1962. He is determined to leave the White House with his balanced budget concept intact, so he will offer a budget about $2 billion lower than the $80 billion document submitted for fiscal 1961. Such a budget would continue the deflationary effect of the fiscal 1960 and 1961 budgets. As November draws nearer Republicans could hail it an opportunity for tax cuts next year.

● NEW SPENDING CEILING SET—Despite Congressional efforts to boost government spending in fiscal 1961, particularly in defense areas, the Eisenhower administration will hold the line at the original budget levels submitted in January, or even lower it. With one exception, it's almost certain that extra defense money will not be spent. Exception: Certain satellite programs designed to speed up the detection of enemy missile launchings. Also, the Budget Bureau has ordered a 3 per cent reduction in government employment.

● NEW CONSUMER PRICE INDEX—The Bureau of Labor Statistics has ordered a new survey of family spending practices so it can bring the consumer price index up to date. The survey will take four years. The current index, which is ten years old, presumably contains errors that limit its usefulness in determining cost of living boosts for workers and price escalation clauses in capital goods purchase contracts. The bureau believes the move to suburbia and the rise in average family income in the last decade have caused considerable shifts in consumer buying habits.

● CAPITOL NOTES—The Small Business Administration is ready to assist small firms dislocated by the federal highway program . . . Temco Aircraft Corp., Dallas, has learned the Navy has canceled its Corvus air-to-surface missile . . . Douglas Aircraft Co., Santa Monica, Calif., will build the missilecar, a slow speed aircraft designed to launch the Navy's Eagle air-to-air missile. Navy officials report the total program will cost about $1 billion.

LOWER "COST PER TON" — designed into every MORGAN Rolling Mill

Today's Mill has to be designed for tomorrow's economy—if it is to successfully compete in the cost and quality race of the coming years.

Improve the product, reduce the cost, do it faster—these are all prime requirements of American Industry—and Morgan know-how has some tangible answers to these demands.

Young engineers with ingenuity, tempered by the experience of older men, bring the greatest advances in Rolling Mill performance to bear on *your* problem.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS

ROLLING MILLS • MORGOIL BEARINGS • GAS PRODUCERS
WIRE MILLS • EJECTORS • REGENERATIVE FURNACE CONTROL

RM-30

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ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

MATERIALS EFFICIENCY

No. 16 in 1960's Management Series STEEL

MAKE MATERIALS WORK HARDER

IF YOU'VE BEEN using the same materials the same way for five years, be on guard against missed opportunities for profits.

Better materials efficiency can help you offset rising costs and give you an extra step on foreign and domestic competition.

In some cases, the new exotic materials provide the answer, but a more basic approach is recommended by many designers and producers of metalworking products.

They advise: "Keep up to date on the changing capabilities and combinations of the 'standard' metals and nonmetallics. They open a major route to creative buying."

Not enough thought has been given to the properties of standard materials, believes Dr. I. S. Servi, director of research for the Metals Div., Kelsey-Hayes Co., Utica, N. Y. Evaluation is limited by test conditions set up many years ago. Advances in manufacture, such as vacuum melting, have improved many of the physical properties of the metals.

• **What's the Cost?**—Smarter use of everyday materials can add dollars where they count most—at the bottom of the profit and loss statement. There is no single source for such savings. The over-all approach may be summed up in this admonition: "Watch your Qs and Ps."

The Qs are quality and quantity.

The Ps are planning, purchasing, production, processes, and packaging.

• **Quality Quotient**—Here's an area where consideration from all angles can bolster profits.

For example: Everyone agrees that quality must be good or sales and reputation will suffer, but there is an opposite side to the coin: You can "waste" quality. Then it becomes another form of expensive industrial scrap.

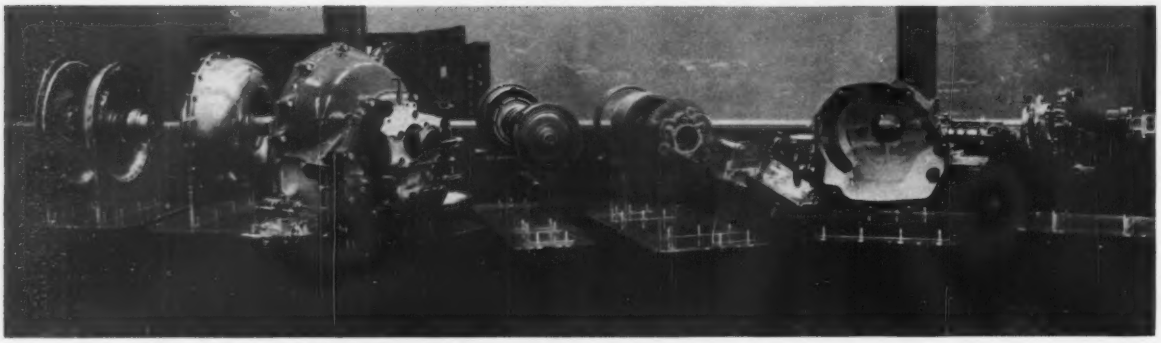
"Don't overgrade or buy a higher quality material than you really need," warns Frank J. DeCrane, director of purchases for Lamson & Sessions Co., Cleveland. He welcomes the help of supplier salesmen in pointing out cases where a less expensive material would do the same job.

Of course, underbuying can be just as deadly. For example: Precision Metalsmiths Inc., Cleveland, uses tool steel to make a precision casting for a hay baler. It's the guide for the wire used in baling, gets the roughest service, and would fail if it did not have the hardness and wear resistance of tool steel. But no one would suggest making the entire baler of this high quality metal.

• **Quantity Quiz**—The purchasing department is in a good position to take a look at the total purchases, combine orders to build savings.

A plant was using sheets for a variety of stampings where the length of run had a wide spread. It found that by combining specifications it could order in larger lots yet reduce total in-process inventory. Results: Lower costs for

Chevy 'Explodes' Its Automatic Transmission . . .



This breakdown shows components used and how they fit into the complete unit

Brainstormers Seek Ways to Make . . .

They examine parts, consider alternates in materials and design. They are (left to right): H. Dregalla, F. Cooney (in foreground), S. Pavelka, Z. Dobey, J. Kowalski

Another group inspects manufacturing to understand processing steps (left to right): A. Kern, E. Ruffing, W. Gregory, D. Telford, T. Smith, C. Calengor, H. Hain

GETTING more out of materials and processes is the purpose behind idea sessions at GM's Chevrolet-Cleveland Div. A special cost reduction program, kicked off this year with a series of group brainstorming assaults on transmission parts and assemblies, shows these major trends in product analysis:

1. A switch to a new material is proposed for many components in the system: (Numerous suggestions involve the investigation of plastics).

2. Fully 50 per cent of all proposals go to the basic design of the component in question.

• **Blowing Up a Storm** — Here's how Chevy goes after fresh cost cutting ideas:

A display is set up to show all Powerglide transmission parts, assemblies and subassemblies. Cutaway and exploded exhibits of the transmission are included. Each part is tagged to show its name, number, material, and manufacturer.

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the short run products, plus the freeing of working capital.

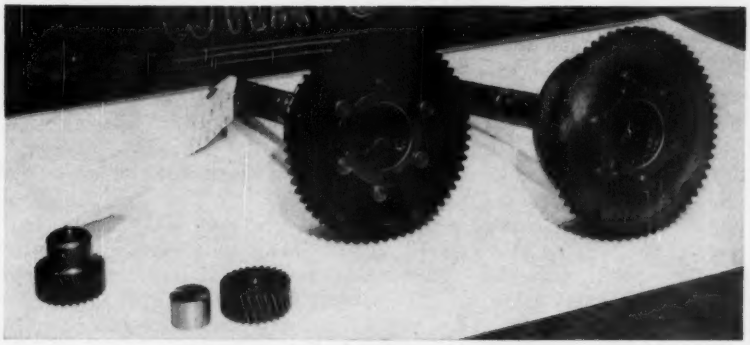
• **Profitable Planning**—There's a salesman's adage: "Plan your work; then work your plan." It points up the importance of looking for ideas and reminds us that they are of no consequence unless put into practice. It's part of management's responsibility to see that a plan for improving materials efficiency is kept working.

Ideas can come from any source. Suppliers are an important one: C. E. K. Mees of Eastman Kodak Co. once said: "When you lock the door of the laboratory, you lock *out* more than you lock *in*." True, you can't broadcast all you plans and problems, but the more your supplier knows about your use of his product, the more likely it is that he can save you money.

Aluminum and steel producers, particularly, have given extensive help to users. Their aid has even led to new enterprises. Reynolds Metals Co.'s designs helped to launch aluminum boatbuilders. U. S. Steel Corp. and the University of Wisconsin have worked out a system of bulk handling milk with stainless steel tanks which has brought about a new line for dairy equipment manufacturers.

Customer feedback is another wellspring of ideas. Here you can learn what's good ("Your bottle

To Help Get These Gear Changes as . . .



New gear (right) is welded, minimizes machining with powder metal parts

Materials, Processes Work Harder

The ideas are evaluated by (left to right) E. Balchak, R. Nosker, M. Limburg, H. Price, W. Losse, E. Armstrong (in foreground) and C. Proffer. Test samples are then made and checked. Proving ground tests, more expensive, are last

The division assigns 242 supervisory personnel to 42 committees, representing these departments: Master mechanics, production, inspection, plant engineering, purchasing, materials, product engineering, production training, and General Motors Institute students. Each committee is assigned to one of 18 component segments comprising the complete transmission.

Once assigned, each committee is given two days in which to inspect the display, ask questions about the nature and function of any part, and write its proposals. Management says that the interest and enthusiasm of the groups make additional time unnecessary for this part of the program. Important here, says Chevy, is the freedom of brainstormers to chase down the production and handling of any given part anywhere in the plant; an original idea might be stifled if the originator is unfamiliar with a part or process.

• **After the Storm**—All proposals are forwarded from the committee to a review group composed of superintendents from purchasing, production, master mechanic, inspection, engineering functions. The group then assigns each idea to a department for technical evaluation and study. The result is a formal report on the idea, which is returned to the review committee. The net effect: Pressure to try every idea.

Final review of all proposals and approval for further experimental testing rest with a committee comprising the plant manager, master mechanic, general superintendent of production, product engineer, purchasing agent and standards chief. Proposals are tried out first on an individual and then in the laboratory; once parts pass the lab tests, they are put through final proving ground checks, as required.

• **Sparking Materials Efficiency**—To spark ideas for better materials utilization, Chevy offers these thought starters to the teams:

1. Can a more expensive material be used to reduce unit costs?

2. Can less expensive material be used, by substituting: Commercial quality steel? Hot rolled for cold rolled steel? Available material, waste from other operations? Gray iron or magnesium for aluminum? Plastic for metal? Cheaper alloy? Commercial tolerances?

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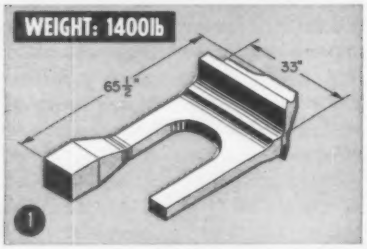
opener really works well.") and bad ("Decorating it with diamonds makes it too expensive.") about your products. Salesmen can help, when they know that you will listen to legitimate stories. One company, now a leader in its industry, asks all salesmen to report customer complaints regularly, leaves space for such comments on its call report forms, follows up to make sure that appropriate action has been taken.

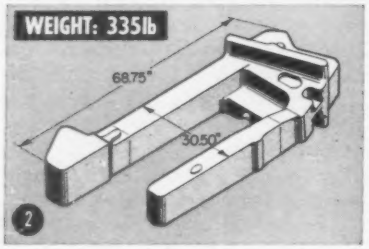
Plant personnel, from any area, can contribute if they know the objectives. General Motors' Chevrolet-Cleveland Div. (see above) organized the search for in-plant improvement and has found it fruitful. Listen to H. T. (Bing) Price, operations manager for transmissions: "When an idea is proposed, it can't be turned down without study. We require a written report, giving reasons for rejection, plus additional intensive review to be sure that adequate thought is given to each proposal. Our management group is enthusiastic about the brainstorming approach and gets results with it. Staying competitive takes our best efforts."

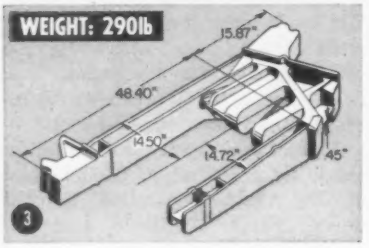
• **Buy It Right**—In many progressive companies, a representative of the purchasing department is called in during the planning stages. With his information on costs and sources, he can help arrive at the

Forging Changes Save Material

Aluminum Co. of America shifted its design from a hand forging in Stage 1 to a precision forging in Stage 3. Machining losses slid from 1170 lb in Stage 1, to 415 lb in Stage 2 (with blocker-type design), to 60 lb in Stage 3







lowest net cost for a product. And he needs to ask, at all times, whether a cheaper product would perform as well as a more expensive one.

Thompson Ramo Wooldridge Inc. had been machining a ring—starting with a rough forging. Changing to a semiprocessed ring (the forging was rolled, contoured, and sloped) meant a higher cost for the purchased unit, but end cost was trimmed 43 per cent because of reduced machining.

But a buying (and planning) decision can go the other way too. The same company was using an alloy bolt where a carbon steel would do. Eliminating the alloy saved 5 cents per bolt.

Another example of making materials work harder: All tin plate used to be hot dipped; it worked well but took a lot of tin. Wartime restrictions could have wiped out the canning industry, but electrolytic tin plate enabled the mills to cut down on tin consumption and produce more cans. A further saving was made by coating heavier on one side of the sheet than the other. A recent development, thinner tin plate, may lead to lighter cans. It also offers sales possibilities for throwaway food trays and dishes.

• **Profits in Production**—Large and small plants have benefited from careful attention to production methods to get more out of materials.

Here's an example from a modest size stamping plant: Making a part for an assembly on a progressive die, it had scrap pieces. They weren't large. But the company had been buying washers for the assembled unit. So it added punches to the die and turns out washers when it makes the part. Annual savings will run into five figures.

Another example: A small shop making a precision spacer designed a special tool for a drill press and was able to ream and chamfer the part (held in a collet chuck) without using a screw machine. The action helped it land a contract.

• **Progress in Processing** — It's a chore to keep up with new developments in processing, but it pays and pays well.

How about heat treating?

Grinding after heat treatment is expensive; if better equipment in the heat treat will reduce grinding, it could help. Also, more and more heat treating is done on the production line, eliminating the handling and delays required where it is handled in a special section of the shop.

Special plating processes will reduce polishing and buffing, or prefinished stock (plated, painted, or plastic coated) can eliminate it completely. Processing can reduce the cost of the raw materials; chromizing can provide a corrosion resistant surface; carburizing adds hardness or wear resistance; nitrogen or sulfur can be used as surface layers in steel.

• **Practical Packaging**—It's a basic principle that the least packaging is the best. How far can you go?

One company gets shipments of insulation by truck. The trailer is backed up to the loading dock and unloaded directly onto the production line. When the trailer is empty, the next one is cycled into use. Scheduling insures that there is always a full trailer waiting—so there is no warehousing of a bulky product, no wrapping and unwrapping for shipment.

The example points out the effect of shipping method on the nature of the package. And here, too, new uses for old materials are fighting with new methods. Popcorn has been used as a packaging material; tape reinforced with glass fibers is far stronger than paper, and large "cans" have been used to maintain a protective atmosphere for long term storage.

• **Perpetual Progress**—Take a few minutes to compare your present practices with those of five or ten years ago. That will put you in a better position to see evidence of progress.

Chances are good that you are making materials work harder for you; still, as General Motors plants have found, a continuing review will help to make sure you get even more from them.

Materials Efficiency

Look What New Materials Can Do

That's the article coming up Aug. 15 in STEEL's 1960 Management series. For a free copy of any or all articles in this 13 part program on materials efficiency (which started July 4 and will run every other week for the rest of the year), write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Also available on the same basis is the companion series on production efficiency which appeared during the first half.

Here's the answer to a fabricator's need: Aircomatic quality welding with stick electrode maneuverability. The new Airco MIGet Gun contains its own welding wire (up to 1100 feet of aluminum) . . . now has wire feed control on the gun itself . . . equipped to operate 50 feet from control box, up to 200 feet from power source . . . weighs less than 4 pounds loaded with aluminum wire.

NOW— Aircomatic® welding anywhere with Airco's new MIGet Gun ...backed by the *most experience*

Want to weld atop a tank, on a mast or a derrick — without carrying around a pallet-full of equipment? The all-new MIGet Gun lets you weld in such out-of-the-way spots, with Aircomatic quality. It's a metal arc gas shielded tool that's perfect for such jobs, or for making numerous short welds — in aluminum, stainless, mild steel, etc. — at remarkably low cost.

Airco also produces a complete line of manual and automatic gas shielded arc welding equipment — Heliwelding for light and medium gauges, Aircomatic for heavier gauges and for cutting . . . and also everything you need in gas welding and cutting equipment, industrial gases, arc welders. Call your nearest Airco office or Authorized Airco Distributor. Look in your Classified Telephone Directory under "Welding Equipment and Supplies" for your nearest Airco representative.

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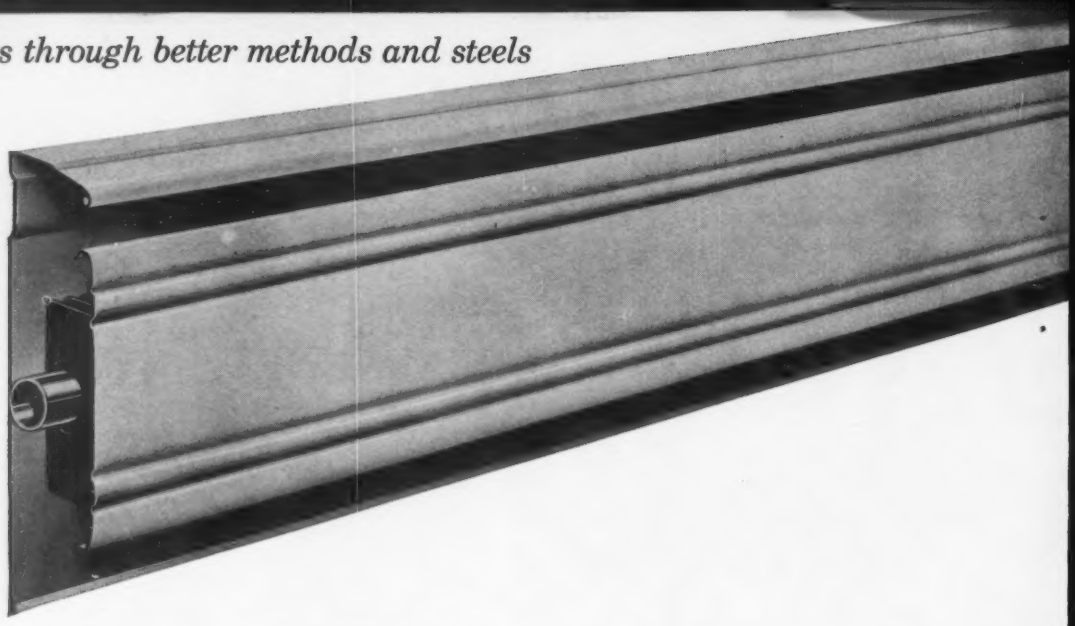

With Weirzin: easy fabrication of beautiful baseboard heating panels that last and last and last.

This high quality electrolytic zinc-coated and bonderized steel sheet is produced to our customers' requirements for uniformity of gage, width and temper. This attention to quality along with the excellent corrosion resistance provided by the zinc coating puts Weirzin at the top of its category and around the bottom of an increasingly large number of commercial and residential interiors.

There, these baseboard heating panels provide a functional border of beauty that requires little or no maintenance. The chemically treated surface holds the smoothest of paint jobs and the tight zinc steel bond eliminates all possibility of underfilm corrosion. Proof that despite the severe bending and forming it undergoes, Weirzin maintains a flawless bond between the zinc coating and the steel sheet.

Result? The fabricator enjoys the workability of a fine product and the ultimate consumer benefits from its serviceable beauty. And that's true of any product made from Weirzin.

Strong, smooth Weirzin electrolytic zinc-coated steel is manufactured by Weirton Steel Company. Its high quality is typical of the many other steels produced by Weirton and used throughout industry to improve products, methods and profits.

Steel

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Weirton, West Virginia

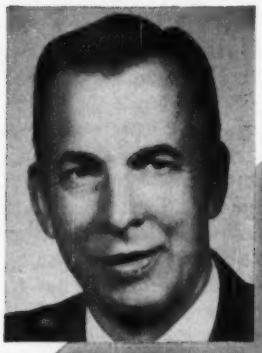
WEIRTON STEEL COMPANY

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

JOHN F. GORDON

F. G. DONNER

GM Grooms 3 Heirs Apparent



EDWARD N. COLE

Strong Division Man

GEORGE RUSSEL

Financial Knowhow

SEMON E. KNUDSEN

Young Charger

LIKE THE YANKEES, GM has a solid first team and some good men on the way up.

Neither of GM's joint chiefs is due to retire for some time. John Gordon, president and chief operating officer, is 60. Frederic Donner, chairman and chief executive officer, is 58. GM has compulsory retirement at 65, but top executives may be retained year to year by a special vote of directors. But you can bet that when Messrs. Gordon and Donner step down there will be well trained men ready to take over.

• **Well-Known**—Edward N. Cole, 51, general manager of Chevrolet Div., has long been the choice of dopesters. He has been boss man of GM's biggest car division since 1956 and has been responsible for several major product developments at Chevy and Cadillac, where he got his early corporate training. Corvair is the latest project Mr. Cole has personally pushed, and insiders claim his enthusiasm has been a strong factor in convincing the corporation it should move into the compact car field.

Don't be fooled by tales that Mr.

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Cole's neck is out because Corvair sales haven't been spectacular. That's competitive talk. Sales are not all GM had hoped for, but Corvair is not selling too far below what the division has programed for its first model year.

• **Rising Star**—A newer star in the GM constellation is Semon E. (Bunky) Knudsen, 48, general manager of Pontiac Div., and son of former GM president, William S. Knudsen. He appears to have done a real job of revitalizing Pontiac as a "youthful" car that older persons also want to buy. Admirers claim he has been responsible for turning the division into a tryout center for many innovations in component design. The reputation for pioneering had been the almost exclusive property of the Oldsmobile Div.

Although both men receive a lot of public attention because they lead well-known and well-advertised car divisions, motordom suspects they won't get a crack at the top job without more seasoning. Two other candidates look more likely and are now in positions where they'll be exposed to more experience. They are Philip J. Monaghan, 46, and James M. Roche, 54.

• **Important Move**—Mr. Monaghan had been general manager of GMC Truck & Coach Div. since 1953. In December last year, he moved over to head up GM's process development staff. This March he was given the added responsibility of the manufacturing staff.

As head of process development, Mr. Monaghan directs a staff of engineers and other specialists at GM's Technical Center. Their efforts are aimed at improving manufacturing methods and devising means of converting basic research findings into production line products.

As head of the manufacturing staff, Mr. Monaghan has jurisdiction over scheduling and procurement, real estate, power, communications, work standards and methods engineering, production engineering, and air transport. He also had sales and dealer experience in the Oldsmobile Div., giving him a broad background in front line dealer relations as well as divisional and corporate administrative duties. Still young as top GM executives go, Mr. Monaghan may be named executive vice president. Top officers generally come from this level, but GM has broken precedent before and could do so again. Motordom thinks Mr. Monaghan is a man to watch.

• **Balanced Choice** — Many company men say you shouldn't discount Jim Roche who now heads up GM's vitally important dealer and distribution operations. Even though he has spent most of his GM life with Cadillac (33 years), he has tremendous presence and a quiet cordiality that impresses those who deal with him. And Cadillac has a reputation as GM's executive training ground—a factor that may count more now that the power of the so-called "Flint (Mich.) crowd" and the Du Pont financiers appears to be waning. Mr. Gordon, GM's present president, came up through Cadillac ranks. So did Ed Cole.

When Harlow Curtice was named GM's president he had a variety of attributes that satisfied the several important groups who then controlled the corporation's destinies. They needed only one man to handle the company's top job. Although Mr. Roche is something of a dark horse, there are those in the business who feel he may offer a similar balance among sales, financial, and manufacturing interests.

• **Split Continues**—It's likely that GM will continue with its dual hierarchy system: The president has a manufacturing and operational background, and the chairman is skilled in financial matters. Some folks call it the "auditor and engineer" combine. George Russel, 55, and executive vice president-finance, is one logical candidate to replace Mr. Donner when he retires. Mr. Russel joined GM's treasurer's staff in New York in 1927 and was elected an executive vice president in 1958. He's on the board and a member of the most important finance, executive, and administrative committees.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
6 Mo. Totals	3,809,578	3,284,012
July		555,410
August		239,149
September		258,151
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
June 25	141,247	127,217
July 2	125,868	108,397
July 9	89,769	123,147
July 16	105,113	127,502
July 23	111,262†	124,446
July 30	111,000*	122,518

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

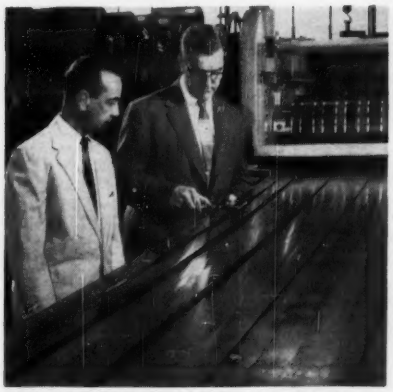
New Engine Lines Planned

Recently, several GM divisions have requested rush quotes on machine tool lines for new engines, report several sources. Apparently, it's tooling that was initially planned for 1963 aluminum engines for the larger Buick, Oldsmobile, and Pontiac cars. Now it's possible that GM may try to rush the lines into production for 1962.

The urgency isn't explained. Some speculation has it that automakers are trying to beat what may be a rush for machine tools after The Machine Tool Exposition—1960 in September. Another suggestion: The move is being made to keep pace with a new engine line Ford is readying at its Cleveland engine plant.

In addition, Chevrolet is supposed to be seeking quotes on a new six cylinder engine line for 1963. There has also been some talk that Chevy is considering a four cylinder line. (Pontiac is the only car division that's bringing out a four cylinder engine this fall. It will have such a powerplant in its compact Tempest.) One possibility is that the Chevrolet engine could be used in the small Corvair sized truck that Chevy is introducing.

GM is also reported to be asking for bids on another transmission line for 1963 production.



At left, Leslie Edgcomb, Jr., director of purchases for Edgcomb Steel, looks on as Joseph Drexler, vice president and general manager, checks the width of a slit strand.

Edgcomb Steel expands product range and speeds delivery with Wean slitting line

Edgcomb Steel Company, like so many other metal service centers, has noted a continuing trend toward the purchase of metals in coil form by its customers. The increasing demand for aluminum, stainless steel and carbon steel in this form is due to the lower costs realized by metal users through coil processing. Edgcomb has equipped three of its four plants with slitting lines to satisfy this requirement.

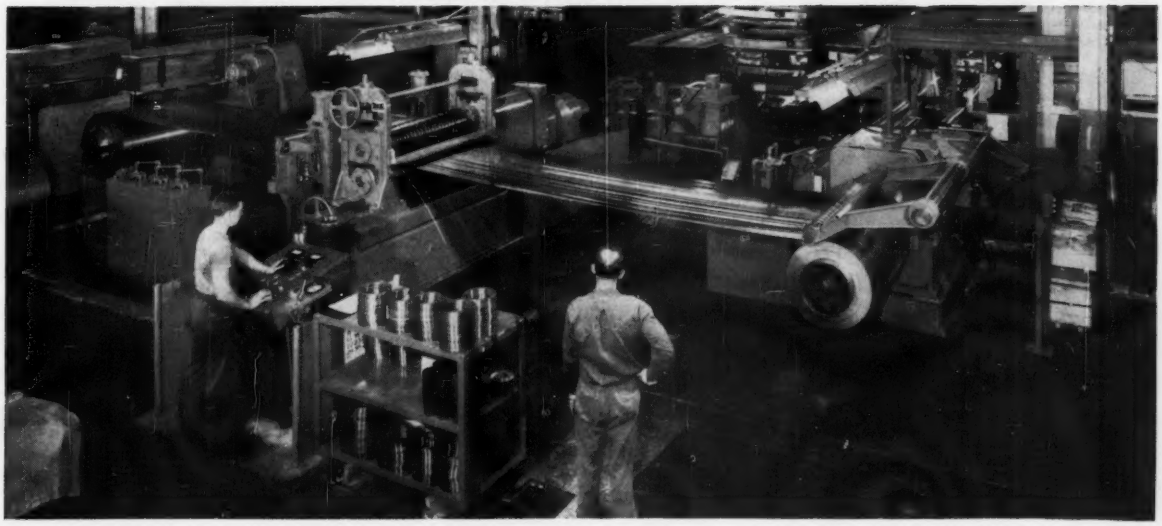
The firm's York plant was set up in 1954 around the Wean slitting line illustrated. Coils, stocked in standard widths up to 48" and gauges ranging up to .125", can be slit and side-trimmed quickly and economically to fill customer's orders for narrower widths. Two sets of knives, one for aluminum and one for steel, equip the line to process both metals at speeds up to 800 fpm.

Wean is a leader in the design and construction of coil processing equipment. Whether your operation involves slitting, shearing or stamping metal from coils, Wean can supply the equipment to do the job quickly, accurately and economically. A comprehensive discussion of these operations is contained in a brochure entitled, "Coil Processing." We will be glad to send you a copy if you will send us your request on business letterhead.

WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard
CLEVELAND 17, OHIO

WEAN

Wean slitting line at Edgcomb Steel's York plant makes 22 cuts in mild steel on this run for a customer who will form tubing from the slit coils.



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. . . **ON NEW PINES HIGH SPEED MODEL 3-T PRESS.** This new progressive bending press has proven the key to increased production, reduced costs on a variety of jobs in such industries as automotive, furniture, appliance, and farm equipment.

"INCREASED PRODUCTION" . . . reported by Bunting Co., Inc., Philadelphia. Accurate, quality bends are produced on the 3-T three times faster than by conventional methods. Speeds up to 1500 bends an hour on tubular parts up to 1" O.D.

"BROADER FLEXIBILITY" . . . says Kalamazoo Furniture Company, Kalamazoo, Michigan. Wide open tooling area permits rapid progressive bending in varied planes. Up to 10 different bend angles are automatically produced in a single setup with maintained plus or minus ½ degree accuracy.

"FASTER SETUP" . . . reported by Configured Tube Products, Bellwood, Illinois. Pick-out pins in indexing turret permit quick bend angle selection, are easily stored with stop gauges for repeat work. Quick change tooling contributes to fast, 15 minute setups.

✱ . . . **ON MODEL 6-T PRESS.** At Chromcraft Corporation, St. Louis, this multiple bending press saves time simultaneously forming "U" frames in two and three tubes,per cycle at speeds up to 2000 bends an hour.

✱ . . . **ON MODEL 20-T PRESS.** At The AP Parts Corporation, Toledo, progressive bending of tubes up to 2" O.D. has increased efficiency 20% with speeds up to 800 bends an hour and near elimination of pass-along work-handling.

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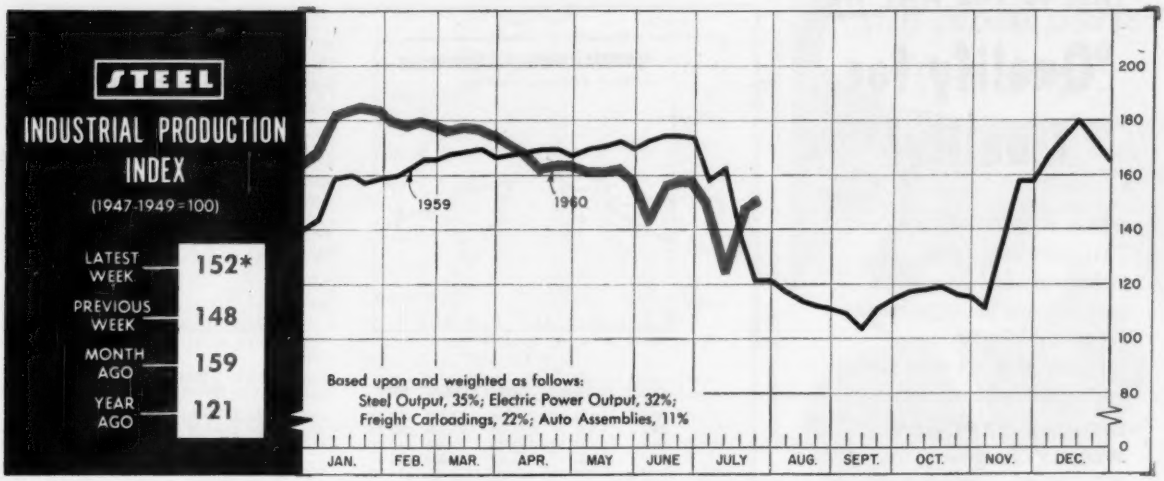
PRODUCTION ENGINEERING SHOW SEPT. 6-16 1960 NAVY PIER, CHICAGO

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY



*Week ended July 23.

Second Half Depends on Inventories

YOUR DECISIONS on inventory policy may determine the trend of the economy during the second half. A halt to inventory cutting (the primary factor in the decline of many barometers during the second quarter) or rebuilding could bring about the hoped for uptrend in the months immediately ahead.

• **Demand Is Good**—There is little, if anything, wrong with demand for services and finished goods. Gross national product in the second quarter helped validate that claim. Despite the dropoff in inventory accumulation, the seasonally adjusted annual total rose to $505 billion, up $3.7 billion from the rate in the first quarter. For added proof, there is the persistent 2 per cent gain in department store sales (vs. 1959's) so far this year.

Despite some uncertainty recently noted in consumer surveys (see STEEL, July 11, pp. 65-67) there is a potent reason (more money) for expecting demand to continue at a strong pace. At $405.8 billion (annual rate) in June, personal income advanced for the tenth consecutive month. The rate in the first half was 5.5 per cent higher than it was in the year-ago total. Combined with fairly stable prices (the consumer price index went up only 2 per cent during the period) buyers are better off today than ever before.

• **Ready for Reversal** — Durable goods inventories generally are at a level which many analysts consider barely adequate to support such a high level of consumption. There are two notable exceptions to the rule—autos and appliances. In the case of autos, the big stock liquidation period is at hand, and we'll have to await developments before we know whether that industry is in trouble. Most producers are assuming that the 1.2 million unit stockpile (imports included) will be whittled down to manageable size by Oct. 1. As for appliance makers, they are not in doubt—stocks are way too high because consumers

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,533[1]	1,550	345
Electric Power Distributed (million kw-hr)	14,400[1]	14,208	13,577
Bituminous Coal Output (1000 tons)	7,285[1]	1,265	7,342
Crude Oil Production (daily avg—1000 bbl)	6,830[1]	6,832	6,855
Construction Volume (*ENR*—millions)	$519.8	$601.1	$525.9
Auto, Truck Output, U. S., Canada (*Ward's*)	138,623[1]	133,665	157,016
TRADE			
Freight Carloadings (1000 Cars)	640[1]	607	536
Intercity Truck Tonnage (changes from year ago)	−3.7%	−17.7%	+12.9%
Business Failures (Dun & Bradstreet)	258	271	242
Currency in Circulation (millions)[3]	$32.199	$32,361	$32,036
Dept. Store Sales (changes from year ago)[3]	+2%	−14%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$28,436	$26,178	$26,504
Federal Gross Debt (billions)	$288.8	$285.9	$289.3
Bond Volume, NYSE (millions)	$22.5	$23.5	$26.0
Stocks Sales, NYSE (thousands of shares)	12,577	12,996	14,785
Loans and Investments (billions)[4]	$105.5	$103.3	$105 5
U. S. Govt. Obligations Held (billions)[4]	$27.5	$25.3	$31.5
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	233.3	232.5	217.6
All Commodities[7]	119.6	119.7	119.3
Commodities Other than Farm & Foods[7]	128.3	128.3	128.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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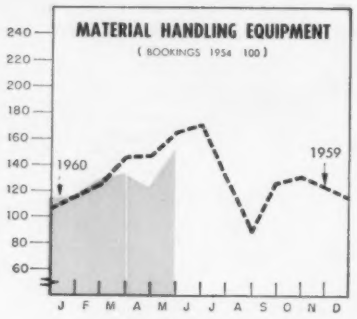
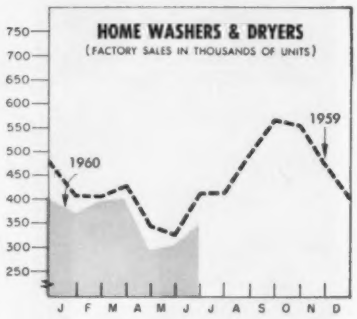
THE BUSINESS TREND





	1960	1959	1958	1957
Jan.	114.96	115.84	93.07	126.34
Feb.	128.74	124.77	93.49	139.29
Mar.	133.60	146.36	97.89	140.76
Apr.	122.41	147.28	122.36	132.67
May	150.33	164.45	118.04	157.95
June	.....	170.72	131.15	121.57
July	.....	130.26	134.34	128.31
Aug.	.....	87.02	104.46	110.09
Sept.	.....	126.43	85.41	116.79
Oct.	.....	131.09	111.35	124.80
Nov.	.....	124.16	110.88	87.80
Dec.	.....	113.78	105.97	105.65
Avg	.....	131.85	109.87	124.34

Material Handling Institute Inc.

	Washers		Dryers	
	1960	1959	1960	1959
Jan.	254,565	288,491	111,603	118,220
Feb.	283,640	297,826	108,367	106,274
Mar.	305,635	329,668	90,205	98,434
Apr.	235,828	274,372	53,213	67,752
May	243,943	277,934	53,700	45,903
June	276,955	341,894	64,950	70,838
July	.....	318,063	.....	95,248
Aug.	.....	359,849	.....	133,197
Sept.	.....	394,112	.....	174,560
Oct.	.....	374,135	.....	179,669
Nov.	.....	312,796	.....	157,047
Dec.	.....	264,236	.....	134,633
Totals	.....	3,833,376	.....	1,381,775

American Home Laundry Mfrs. Assn.

Charts copyright, 1960, STEEL.

just aren't spending as much for white goods as historical trends indicate they should.

Outside of those two areas, indications are that manufacturers are at the crossroads inventorywise. In durable goods industries, the book value of purchased materials in stock (seasonally adjusted) has remained constant for three consecutive months. The situation is nearly the same for nondurables. The latest survey of the National Association of Purchasing Agents indicates a leveling off of inventories, although there are some areas where the downtrend is still pronounced. STEEL's quarterly survey of metal buyers (see Page 109) also points to a halt in stock liquidation. Most steel producers report that even though there has been no significant upturn in orders, the downtrend seems to have been checked.

• **Three Choices** — Manufacturers soon must make the choice of which way they want to go on inventories. There are three alternatives:

1. They can continue to cut stocks. Many believe the practice would lead to a full-fledged inventory recession extending into 1961.

2. They can stand pat and order only enough materials to cover current production. Since demand for services and finished goods is remaining firm, this would result in a further sidewise movement of the general economy at a high level.

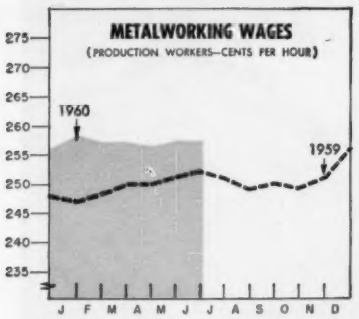
3. They can increase inventories. (In relation to both sales and orders, stocks are well below the levels prevailing in previous business recoveries.) This would give the economy considerable zip in the final months of 1960.

Businessmen See Upturn

Businessmen surveyed by the National Industrial Conference Board cite the completion of the inventory adjustment as one reason for anticipating a good second half. They feel that customers will have to order to meet operating requirements, which should be higher as orders increase.

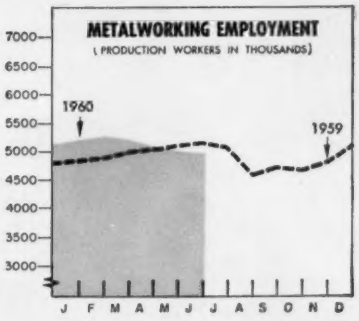
Sixty-three per cent of the 210 manufacturers participating look for increased bookings in the last six months of 1960, while 19 per cent expect to continue at the first half pace. While slightly over half think their yearend inventories will be lower than they are now, the reduction will not be great. About one-fourth look for an upturn.

Sixty-one per cent look for before



1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
June	284	238	250	222	266
July	281	237	250	222	266
Aug.	264	238	250	222	269
Sept.	266	239	251	223	271
Oct.	265	236	252	224	270
Nov.	277	236	252	224	267
Dec.	285	241	254	227	273
1960					
Jan.	287	244	255	228	276
Feb.	286	243	255	228	275
Mar.	285	242	256	228	273
Apr.	285	242	255	227	271
May	282	245	256	228	272
June	283	245	256	229	273

U. S. Bureau of Labor Statistics.



1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
June	1,067	866	1,167	833	1,224
July	1,038	847	1,149	836	1,207
Aug.	628	815	1,138	849	1,132
Sept.	611	841	1,167	888	1,200
Oct.	602	812	1,147	893	1,208
Nov.	975	800	1,136	882	1,026
Dec.	1,039	841	1,166	892	1,172
1960					
Jan.	1,048	857	1,179	892	1,239
Feb.	1,052	863	1,191	890	1,245
Mar.	1,043	954	1,186	879	1,221
Apr.	1,020	837	1,176	860	1,187
May	995	835	1,163	855	1,175
June	969	839	1,160	853	1,139

U. S. Bureau of Labor Statistics.

tax profits to be better this year than last year, based largely on improved sales in the last half. Many feel that new models and products will stimulate sales enough to produce the anticipated upturn.

However, a few firms see troubles ahead, and some are lacking in optimism simply because they can't find evidence to support it.

Index Continues Recovery

As anticipated, STEEL's industrial production index continued its post-holiday recovery, gaining 4 points to a preliminary 152 (1947-49=100) during the week ended July 23. All four components of the index contributed to the increase.

Steel production is still the most uncertain element. Instead of posting a steady week-by-week gain following the holiday shutdowns, the industry is finding it difficult to sustain operations even at 54 per cent of capacity. Output for July had been forecast at about 55 per cent of capacity, but it fell far short of the goal. The development may necessitate further downward revisions in estimates for August and the year as a whole.

The index should hold near its present level for the week ended July 30. Auto output will remain at the prior week's level primarily because of Ford's efforts to recover strike losses. Chrysler Corp. and Studebaker-Packard are shut down for model changeover. Electricity output and railroad freight carloadings should show minor gains.

Trends Fore and Aft

• Bookings for material handling equipment showed the best gain of the year during May. (See graph and table, Page 70.)

• Orders for resistance welding equipment advanced from $1,870,-918 in May to $2,204,982 in June, reports the Resistance Welder Manufacturers Association.

• New freight car orders in June fell to 321 units, the lowest monthly total since June, 1958, says the American Railway Car Institute.

• Production trends in appliances were mixed in June. Factory sales of home laundry appliances jumped 14 per cent over the May levels. Sales still lag considerably behind year-ago totals. (See table and graph, Page 70.) Factory sales of vacuum cleaners were 245,790, down 10.9 per cent from the year-ago figure, states the Vacuum Cleaner Manufacturers Association.

still more parts from wire!
Weld Stud 70/min.
Tube Fitting 60/min.
Flanged Collar 85/min.
Ball Stud 60/min.
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These parts are formed practically scrapless. All achieve remarkable savings over past methods.
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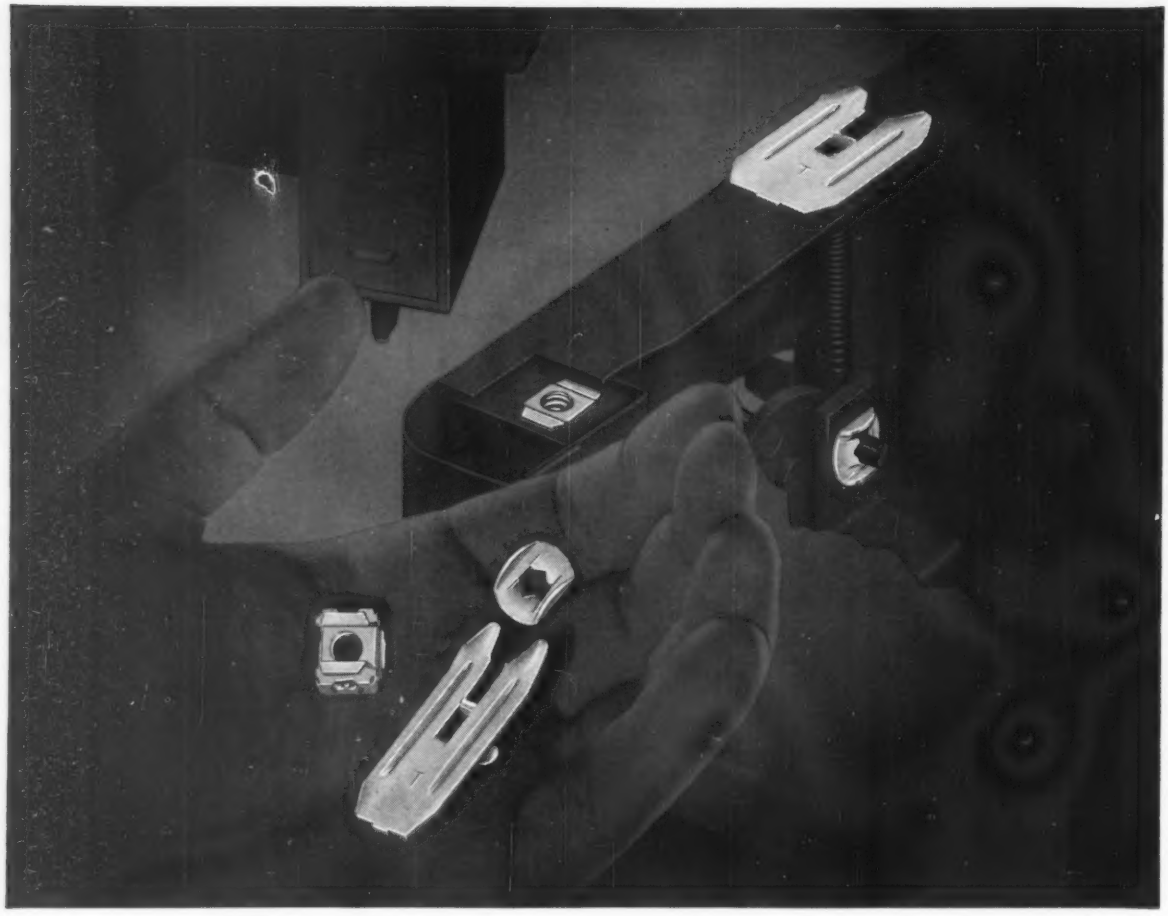

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A special Dart-Type SPEED CLIP® snaps into a punched hole, securely anchors one end of the drawer latching mechanism spring. A standard Push-On SPEED NUT "bites" into a stud; prevents the other spring end plus latching bar from backing off. Desk tops as well as desk and table legs, are attached with the help of SPEED GRIP® Nut Retainers that snap into bolt-receiving position in punched holes. A Push-On completes the file drawer follow block assembly; two more secure each filing cabinet drawer card holder.

This should give you an idea of what a free Fastening Analysis can probably do for you in savings and improvements on present or new products. Look up your Tinnerman representative in the Yellow Pages under "Fasteners". Or write to

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D. L. BUTTREY
Udylite factory manager

MARSHALL SCHOBER
asst. to president at Latrobe

JAMES DAMATO
Boice Gages v. p.-mfg.

A. LEO WEST
joins Fairbanks, Morse

D. L. Buttrey was made factory manager, **Robert Cassel** assistant factory manager, Udylite Div., **Udylite Corp.**, Detroit. Mr. Buttrey was vice president and general manager of manufacturing at R. C. Mahon Co. He will be in charge of equipment production for Udylite Div., Warren, Mich. Mr. Cassel, former superintendent in charge of manufacturing, will be in charge of all manufacturing, including inventory and production control.

Woodrow L. Hanson was made general superintendent, Ivanhoe Div., **Reliance Electric & Engineering Co.**, Cleveland. **G. Porter Packard** was made manager-marketing services for the company. **Clyde W. Seal** succeeds **J. P. Reeves**, resigned, as product manager, Marketing Div.

Joseph P. Hensel was named manager-machinery sales, **Pennsylvania Crusher Div.**, Bath Iron Works Corp., West Chester, Pa.

William S. Aiken was named director of engineering, **Thompson-Ramo-Wooldridge Products Co.**, Beverly Hills, Calif., a division of Thompson Ramo Wooldridge Inc.

James F. Ryan was placed in charge of welding and brazing sales for **Whitehead Metals Inc.**, New York, an affiliate of International Nickel Co. He succeeds **John T. Stewart**, assigned new product development.

Autocar Div., Exton, Pa., White Motor Co., named **Lee J. Perme** assistant to Karl A. Roesch, vice president of White Motor, and general manager, Autocar.

Marshall Schober, manager of marketing for **Latrobe Steel Co.**, Latrobe, Pa., was named assistant to the president.

James Damato was made vice president-manufacturing, **Boice Gages Inc.**, Hyde Park, N. Y. He was with Crosby Valve & Gage Co. **Raymond Isacsson** was made regional sales manager for the Midwest area.

D. G. Wilson was made manager of the Torrance, Calif., plant of **Aero Hydraulics Div.** of Vickers Inc., division of Sperry Rand Corp. He was industrial engineering manager of the division, Detroit. **J. R. Rea** was made manager of the division's Joplin, Mo., plant.

Gus Treffeisen was made marketing manager, **Alemite & Instrument Div.**, Stewart-Warner Corp., Chicago. He succeeds **E. N. Robinson**, who last December was made general manager of the division. Mr. Treffeisen was Alemite automotive products sales manager. **Erwin H. Poelke** was made assistant manager of original equipment sales for the division, and manager of its Detroit sales office.

Herbert Olson, assistant sales manager, was promoted to sales manager, **Standard Conveyor Co.**, North St. Paul, Minn. He succeeds **Edward Boberg**, recently resigned.

William H. Morrin was made general sales manager, **Alpha Press & Machine Inc.**, Detroit. He was Michigan representative for Abbey Etna Machine Co.

A. Leo West, former executive vice president and general manager at Clearing Div., U. S. Industries Inc., was appointed vice president-operations, **Fairbanks, Morse & Co.**, Chicago.

C. Donald Steinwedel was named manager-warehouse operations by **Carpenter Steel Co.**, Reading, Pa.

E. Clinton Towl, administrative vice president, was named president of **Grumman Aircraft Engineering Corp.**, Bethpage, N. Y. He succeeds the late **Leon A. Swirbul. W. T. Schwendler**, senior vice president, was named chairman of the executive committee.

D. F. Folz was made director of **Lockheed Aircraft Corp.'s** diversification task force, Burbank, Calif. He succeeds **Dr. H. Igor Ansoff**, who was made vice president for plans and programs at Lockheed Electronics Co. in Plainfield, N. J.

Arthur G. Curtin fills the new post of manager-construction marketing, **I-T-E Circuit Breaker Co.**, Philadelphia. For the last two years, he was manager-contractor marketing. **Hugh Maxwell**, former manager-resale marketing, recently resigned.

John R. Purdy was made assistant superintendent, coke plant, Pueblo, Colo., plant of **Colorado Fuel & Iron Corp.** He succeeds **Paul Yarnell**, retired.

Bliss M. Bushman was made director of systems engineering, **Consolidated Systems Corp.**, Monrovia, Calif. **John D. Gum** and **James T.**

LARS EKHOLM

ROBERT HENDERSON

Climax Molybdenum vice presidents

FRED P. HAUCK

ROBERT C. DICKEY

Michigan Abrasive executive posts

Sharpsteen were made assistant directors-systems engineering.

Lars Ekholm was appointed vice president-Eastern operations; **Robert Henderson** vice president-Western operations of **Climax Molybdenum Co.**, division of American Metal Climax Inc., New York.

F. C. Cahn was elected director of sales for **Allied Metal Hose Co.**, Long Island City, N. Y., a new post.

Richard W. Lamp was made production manager, **Orr & Sembower Inc.**, Reading, Pa.

Forrest F. Hinkley resigned as vice president and general manager, Western Div., Aeroquip Corp., and has purchased **Speed-D-Burr Corp.**, Glendale, Calif., where he will serve as president and general manager.

Douglas D. Brien was named president of **Ohio Gear Co.**, Cleveland. He succeeds **Harrison Browning**, appointed chairman. Mr. Brien was executive vice president.

Fred P. Hauck was elected executive vice president; **Robert C. Dickey** as vice president-manufacturing, **Michigan Abrasive Co.**, Detroit. Mr. Hauck was vice president-research and manufacturing. Mr. Dickey was plant manager.

Richard E. Krengel was elected vice president, **Ex-Cell-O Corp. of Canada Ltd.**, London, Ont., subsidiary of Ex-Cell-O Corp., Detroit. He was general manager of the Canadian firm.

William J. Jenkins joined the sales staff of **S. P. Kinney Engineers Inc.**, Carnegie, Pa. He was with Philadelphia Gear Corp.

William T. McGinnis was appointed executive vice president of **Keokuk Electro-Metals Co.**, Keokuk, Iowa, division of Vanadium Corp. of America.

Charles F. Simmers was named chief engineer, Engineering & Construction Div., **Koppers Co. Inc.**, Pittsburgh. He succeeds **A. B. Fisher Jr.**, recently given an overseas assignment.

R. P. Stuntz was named manager of field sales; **L. D. Christie Jr.** product manager-technical sales, Refractories Div., New York, **Babcock & Wilcox Co.**

Atlantic Wire Co., Branford, Conn., appointed **Elmer S. Tyler Jr.** manager of sales. He is replaced by **Renato Rodriguez** as product control manager. **H. William Waters** is production manager.

William W. Keefer was named vice president-controller, **Warner Electric Brake & Clutch Co.**, Beloit, Wis.

George Havas was made vice president and director of engineering, **Kaiser Industries Corp.**, Oakland, Calif. Since 1958, he has served as general manager, Heavy Construction Div., and international subsidiaries.

Allen B. Hughes was made West Coast district manager, **Bay State**

FORREST F. HINKLEY

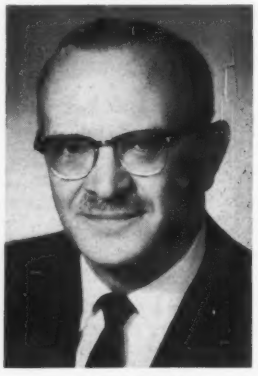
buys Speed-D-Burr

DOUGLAS D. BRIEN

Ohio Gear president

CHARLES F. SIMMERS

Koppers div. chf. eng.



GEORGE HAVAS

Kaiser v. p.-eng. dir.

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RICHARD P. KRAUSE
Pennsylvania Eng. chief eng.

HAROLD J. MILLER
joins Detroit Controls Div.

JOHN J. WYANDT
Republic supt.-Canton

FRANK P. DeLUCA JR.
Acoustica Associates pres.

GEORGE D. BUTLER
Internat'l Resistance v. p.

ROBERT E. GARRETT
U. S. Pipe & Foundry pres.

Abrasive Products Co., Westboro, Mass.

Frank P. DeLuca Jr. was named president, **Acoustica Associates Inc.**, Plainview, N. Y., and subsidiaries. He was executive vice president. **Robert L. Rod** fills the new post of chairman.

George D. Butler was elected a vice president of **International Resistance Co.**, Philadelphia. He has been director of marketing for the last two years.

S. Richard Stout was named vice president-sales, **Glascote Products**, Cleveland, subsidiary of A. O. Smith Corp. He was sales manager.

Earl G. Lindsey was named works manager of **Westinghouse Electric Corp.'s** Lamp Div. plant in Little Rock, Ark.

Dale F. Fahrendorf succeeds the late **Jack L. Gordon** as St. Louis district manager, **Luria Bros. & Co. Inc.**

Robert E. Garrett was elected president and chief executive officer of **United States Pipe & Foundry Co.**, Birmingham. He succeeds **Claude S. Lawson**, who continues as chairman. Mr. Garrett was executive vice president.

J. B. Nicolls Jr., assistant general sales manager-industrial products, Tractor & Implement Div., **Ford Motor Co.**, at Birmingham, Mich., heads the division's expanded industrial sales organization. He was divisional export-import manager. New departments established under Mr. Nicolls: Original Equipment Manufacturers' Sales, with **F. W. Conover** as manager; Ford Industrial Sales, with **Harold Hanke** as manager; and Allied Equipment Sales, with **W. R. Howe** as manager.

Emmert A. Timm, recently made general manager, **Hoefer Mfg. Co.**, Freeport, Ill., was elected vice president. He has recently served as chief engineer, and in addition to executive duties, continues head of the Engineering Dept.

Richard P. Krause was named chief engineer of **Pennsylvania Engineering Corp.**, New Castle, Pa. He was with Pittsburgh Steel Co. **A. C. Kohnfelder**, former chief engineer, fills the new post of assistant to the vice president-engineering.

Harold J. Miller joined **Detroit Controls Div.**, American-Standard Div., American Radiator & Standard Sanitary Corp., as plant manager, a new post. He was manager of manufacturing and reactor installations at American-Standard's Advanced Technology Laboratories, Mountain View, Calif.

John J. Wyandt was appointed superintendent of the Open Hearth Dept. and No. 2 and 3 electric furnace shops at **Republic Steel Corp's** Central Alloy District steel plant in Canton, Ohio. He succeeds **Arthur K. Blough**, named chairman of Republic's open hearth and electric furnace committees, and transferred to Cleveland general offices. **John P. Rebillot** was made assistant superintendent at Canton, succeeding Mr. Wyandt.

Ward B. Browning Jr. was named assistant chief engineer, **Armco Div.**, Armco Steel Corp., Middletown, Ohio. He is succeeded as assistant works engineer, Butler, Pa., Works, by **Charles G. Kramer**.

Donald C. Suhr was elected president and chief operating officer of **Clinton Engines Corp.**, Clinton, Mich.

Willis S. Boice was promoted from assistant sales manager to sales manager, **Boice-Crane Co.**, Toledo, Ohio.

William J. Dickman was promoted to assistant sales manager, Union Div., **Clayton Mark & Co.**, Evanston, Ill.

OBITUARIES...

Henry T. Chandler, 69, a vice president, **Vanadium Corp. of America**, New York, died July 19.

Jack L. Gordon, 61, vice president of **Luria Bros. & Co. Inc.**, and St. Louis district manager, died July 13.

Russell S. Easterday, 59, chairman, **F. C. Thornton Co.**, Cleveland, died July 19.

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Two Firms Expand Strategic-Udy Work

STRATEGIC Materials Corp., Buffalo, has entered into an agreement with Universal-Cyclops Steel Corp., Bridgeville, Pa., for the joint development of the use of the Strategic-Udy processes in the production of materials for use in stainless steels and heat resisting alloys.

Under the agreement, Strategic Materials will build a $1.5 million addition to its plant at Niagara Falls, Ont. The new facility is scheduled to be in operation around the end of this year. This represents a large scale increase in the pilot plant facility that has been in operation for nearly three years exploring the use of low grade ores previously considered unusable.

The Strategic-Udy processes may permit for the first time the economical utilization of low grade lateritic and chromite ores in the commercial production of high quality stainless steels and heat resisting alloys, says F. W. Chambers, president of Strategic Materials Corp. This development would provide markets for the large deposits of these low grade ores.

Strategic will build the plant addition and be responsible for its operation. Universal Cyclops will furnish technical assistance. The plant addition will include an electric furnace, a kiln, and auxiliary facilities.

Republic Installs Press

Republic Steel Corp., Cleveland, has installed a 500 ton oil-hydraulic forging and extrusion press at its Research Center, Independence, Ohio. It was designed by Birdsboro Corp., Birdsboro, Pa., for unusually high speed and flexible operation. The press is being used to explore the behavior of new metals under forging and extrusion conditions.

Minster Machine Expands

Minster Machine Co., Minster, Ohio, has broken ground for a 30,000 sq ft plant addition for the assembly of metal forming presses. President John F. Herkenhoff says Minster will show five new presses at The Machine Tool Exposition—1960, which opens in Chicago on Sept. 6.

Buys Pipe Forming Machine

American Bridge Div., U. S. Steel Corp., Pittsburgh, is installing a high speed machine of new design for spirally forming culvert pipe, with a lock seam joint, from flat galvanized strip. The machine, built by Stamco Inc., New Bremen, Ohio, will produce pipe in diameters of 9 to 21 in. It is scheduled for operation around mid-September.

Brown Aluminum Formed

Brown Fintube Co., Elyria, Ohio, organized the Brown Aluminum & Chemical Co. to specialize in chemical uses of aluminum for the basic steelmaking, stainless steel, and foundry industries. Products will include shot and notch bars for the purification and deoxidizing of steel; bars of special shape for the deoxidizing of steel in the electric steel casting, stainless, and steel industries; and aluminum cylinders for the stainless steel industry.

Officers of the new firm include: President, J. W. Brown; executive vice president, E. J. Skiba; treasurer, H. A. Niederst; and secretary, F. W. Dorn. Robert G. Brown is manager of sales.

Molybdenum Caster Breaks Size Barrier

REFRACTOMET DIV., Universal-Cyclops Steel Corp., Bridgeville, Pa., has melted one of the world's largest arc cast, molybdenum ingots: 17 in. in diameter, 69 in. long, and weighing 5000 lb.

Successful production of an ingot of this size removes development barriers formerly confronting the nation's missile and aircraft industries. Now, a significant increase in the size of finished forgings is possible because of the larger forging billet diameters.

The firm has facilities for producing ingots up to 24 in. in diameter and 100 in. in length. "The limiting factor is the unavailability of extrusion equipment to satisfactorily reduce the ingot to billet form," says P. C. Rossin, manager, Refractomet Div.

Foundry Improves Plant

Wisconsin Centrifugal Foundry Inc., Waukesha, Wis., is enlarging its facilities. The program includes an office building, an 80 per cent larger stainless foundry, a 30 per cent larger machine shop, and a more efficient shipping and receiving department. Cost: About $200,000.

Atlas Titanium Builds

Atlas Titanium Ltd. is constructing an office and research building in Welland, Ont. The firm is a subsidiary of Atlas Steels Ltd., that city, and is engaged in developing fabricating techniques and markets for reactive metals.

Acquires Crane Business

All-State Engineering Co. Inc., Milwaukee, has acquired the industrial crane and hoist business of Borg-Warner Corp., Chicago. The division will be moved to Milwaukee and consolidated with All-State's operations. All-State is adding 5000 sq ft to its plant at 7050 N. 76th St. and will rent additional space to accommodate the facilities.

Enlarges Machinery Plant

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., is adding about 25,000 sq ft to its Cheshire, Conn., plant. The firm, a division of Textron Inc., New York, manufactures metalworking machinery.

Timken Expands Tube Mill

Timken Roller Bearing Co., Canton, Ohio, has completed installation of a $1 million piercing mill for the No. 3 tube mill at its Gambrinus, Ohio, steel mill. The 38 in. unit replaces a 36 in. piercing mill which will be reconditioned for installation in the company's No. 4

tube mill being constructed at Gambrinus. Size ranges of the new mill: Diameters run from 4.5 in. to 12 in. Maximum billet size is 15 ft in length, or 3500 lb. Capacity is 10,000 tons a month.

NEW ADDRESSES

Bee Chemical Co. moved its administrative and sales offices, research and manufacturing facilities, and its divisions to larger quarters at 2700 E. 170th St., Lansing (Chicago), Ill.

Precision Gears Inc. moved to its new, 16,000 sq ft building in Pewaukee, Wis.

Crane Co. moved its executive offices to 155 N. Wacker Dr., Chicago 6, Ill.

Hartman Metal Fabricators Inc. moved from Rochester, N. Y., to Waterloo, N. Y.

Bradley Semiconductor Corp. (formerly Bradley Laboratories Inc.) moved to 275 Welton St., Hamden, Conn. The new building contains 30,000 sq ft of space.

CONSOLIDATIONS

Miniature Precision Bearings Inc., Keene, N. H., acquired **Carter Engineering Co.**, Ferrysburg, Mich., maker of rod-ends, spherical bearings, and ball linkage devices. Carter operations will be transferred to the new owner's Split Ballbearing Div. plant in Lebanon, N. H.

Veet Industries, East Detroit, Mich., acquired **Sourant Mfg. Co.**, Belleville, Mich., producer of hydraulic and air cylinders and pumps, precision parts, welding guns, and automation machines.

Advance Ross Electronics Corp., Chicago, purchased **Magneco Corp.**, Addison, Ill., producer of ferrite products for the electronics industry.

Casting Engineers of Chicago, producer of investment castings and Minicast parts, acquired **Jelrus Precision Casting Corp.**, New York. John McCormick has been appointed general manager of Jelrus. Casting Engineers is a division of Consolidated Foundries & Mfg. Co., Chicago.

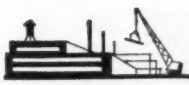
International Process Equipment Co., Dayton, Ohio, has become through merger a division of the **Patterson Foundry & Machine Co.**, East Liverpool, Ohio. All production and management activities will be conducted at Patterson's plant in East Liverpool. Both companies are manufacturers of machinery for process industries.

ASSOCIATIONS

Drop Forging Association, Cleveland, elected these officers: President, E. W. Cress, Buchanan Steel Products Corp., Buchanan, Mich.; and vice president, W. A. Carlile Jr., Columbus Bolt & Forging Co., Columbus, Ohio. W. H. Stocking, Pittsburgh Forgings Co., Pittsburgh, was elected to the board of directors and executive committee.

Dr. C. H. Moore of Indianapolis has been appointed technical director of the **Copper Products Development Association Inc.**, Columbus, Ohio. In addition to Dr. Moore, officers are: Chairman, C. R. Cox, Kennecott Copper Corp.; president, C. E. Weed, Anaconda Co.; vice president, R. G. Page, Phelps Dodge Corp.; vice president, H. S. Wingate, International Nickel Co. of Canada Ltd.; secretary, J. E. Masten, Phelps Dodge Corp.; and treasurer, H. M. Jacob, Inspiration Consolidated Copper Co.

The association conducts research through contracts with laboratories. These contracts have been awarded: "Determination of Increased Uses for Copper & Copper Alloys in the Transportation Industry," to Southwest Research Institute, San Antonio, Tex.; "An Engineering Survey for New Uses for Copper in the Construction Industry," to Battelle Memorial Institute, Columbus, Ohio; "Development of Tarnish-Resistant Copper by Metallurgical Surface Treatment," to Battelle; and "Protection of Copper by Organic & Inorganic Films," to the British Non-Ferrous Metals Research Association, London, England.



NEW PLANTS

Crucible Steel Co. of America, Pittsburgh, established a steel service center at 6416 Navigation Blvd., Houston. A. R. Oakley has been appointed branch manager; John Hook, office manager. Mr. Oakley will report to K. C. Kelly, St. Louis, Crucible's Southern regional manager.

Pipe Line Service Corp., a subsidiary of American Steel Foundries Co., Chicago, plans to build a pipe wrapping and coating plant at North Lima (Youngstown), Ohio. Estimated cost: $1 million.

Continental Can Co., New York, will build a metal can manufacturing plant in St. Joseph, Mo. The plant will contain over 30,000 sq ft of working area, equipped to produce beer cans, and scheduled for operation by July, 1961.

A. J. Gerrard & Co. moved to a new plant at 400 E. Touhy Ave., Des Plaines, Ill. The 80,000 sq ft plant is double the size of its former plant in Melrose Park, Ill. The firm makes steel strapping and supplies.

Linde Co., a division of Union Carbide Corp., New York, will install an on-site, high capacity, oxygen plant in Pueblo, Colo. It will supply more than 200 million cu ft of oxygen a month to the plant of Colorado Fuel & Iron Corp. CF&I is constructing two oxygen converters which will permit an increase of more than 30 per cent in steel production.

Metal Spinners Inc., Milwaukee, opened a 10,000 sq ft plant at Angola, Ind. It will be operated as a wholly owned subsidiary under the name of All Metal Spinners Inc.

General Electric Co., Schenectady, N. Y., will build a $3 million plant in Waterford, N. Y., for the production of basic silicone intermediate chemicals. The 15,000 sq ft plant will replace smaller facilities which will be converted to serve other manufacturing needs at the company's silicone products department.

IPC has a new baby!

I.P.C.'s extensive research in the area of fluorocarbon plastics has given birth to *a whole new series of custom seals, ball seats, diaphragms, V, cup and flange packings.*

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IMPROVES OIL SEAL—A new, Teflon-faced, neoprene oil seal vulcanized to a steel backing is said to hold up under more severe conditions than most conventional types. It will operate successfully at 100 psi and 550° F, claims Charles Dietzell, vice president, International Packings Corp., Bristol, N. H. Shaft finish should be around 6 microinches for best results, he says.

FASTER CASTER— An automatic, rotary pressure, casting machine turns out 600 aluminum pistons an hour for Chevrolet at its Massena, N. Y., foundry. Three units are being readied for the '61 model. Each has two parts—a core stacker and a molder. Ten sets of cores and eight sets of molds are interchangeable.

BUMPS BUMPER BOLTS— An aluminum firm is experimenting with gluing bolt brackets to the inside of automobile bumpers. Brackets are fastened after the bumper is formed. Adhesives cure at 350° F while bumpers age in a precipitation heat treatment. Cost: Less than a penny a bumper. Outlook: Promising.

CERAMIC HEALS ITSELF—Cracks which develop in a new ceramic material mend themselves while resisting 2600° F oxidizing blasts, claims Judson Hubbart, Boeing Airplane Co., Seattle. (Upper limit: 3000° F, for 15 minutes.) The material is a combination of graphite and ceramic powders.

IMPROVES NUCLEAR FUEL— Martin's Nuclear Div., Baltimore, has boosted the heat conductivity of uranium dioxide more than 30 per cent by adding molybdenum fibers. After inserting the mix in thin cladding, the assembly is swaged to increase the density to about 85 per cent of a theoretical limit.

TOO MUCH RELIABILITY?— Some people believe it's too expensive to insist on too much reliability, that it's more sensible to make machinery extremely easy to service. Frigidaire Div., General Motors Corp., Dayton, Ohio, is trying that tack for 1961. The firm has installed a plug in its automatic washers for a new function tester which can spot difficulties in 2 minutes. Former analysis time: 30 minutes.

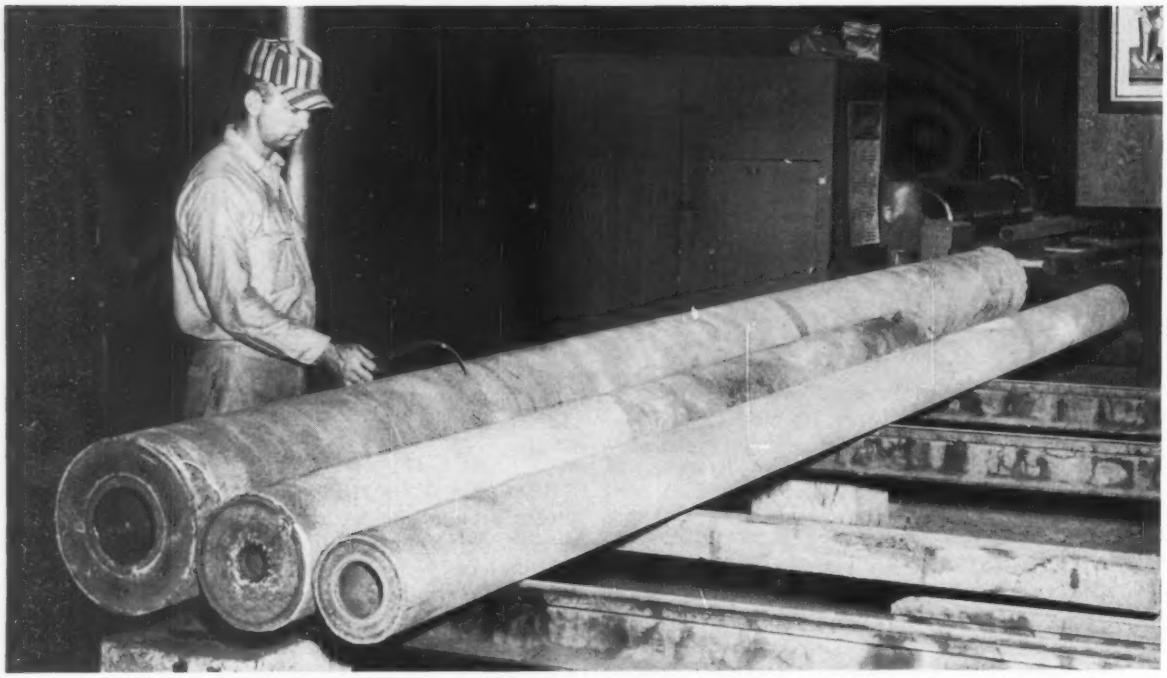
CHEAPER COLUMBIUM— The latest way to produce columbium is to reduce the pentachloride with hydrogen in a fluidized bed, says Battelle Memorial Institute, Columbus, Ohio. Preliminary studies show costs are attractive. Quality is about equal to premium metal now available, the institute claims. (Other methods: Reduction of the oxides and halides.)

DEVELOP EXTRUDED CLADDING—Engineers at Battelle Memorial Institute say that they have worked out a continuous process (extrusion) for cladding extrusions as they are made. Cladding doesn't even have to be the same shape, they claim. Advantages: Close dimensional control of cladding; strong bond between the two; cladding of many shapes impossible to handle by conventional means. Possible uses: Heat exchanger tubes; decorative, load bearing architectural rods.

SOLDERING AID—An immersion tin process improves the solderability of copper by preventing oxidation during the heating period. The developer, Westinghouse Electric Corp., Pittsburgh, says only normal precautions for handling are required.

NO-LUBE TRENDS—Chrysler Corp., Detroit, is reported to be experimenting with plastic or vinyl coated gears in transmissions and other power transmitting devices. Lubrication would be unnecessary.

SPACE PROGRESS— A high capacity, high pressure pump for liquid hydrogen is called a "significant accomplishment" in furthering our efforts to land on the moon. Aerojet-General Corp., a subsidiary of General Tire & Rubber Co., Azusa, Calif., describes it as a part of a 200,000 lb thrust engine.



These heavy wall tubes (in the as-cast condition) were centrifugally cast with new ceramic mold process at Special Products Div., American Cast Iron Pipe Co., Birmingham

Centrifugally Cast Tubing Gets Boost in Strength

Ceramic mold is key to process improvement. It allows increased spinning speeds that produce denser and sounder castings with assured concentricity

THANKS to a process improvement, you can get added quality from centrifugally cast iron, carbon and alloy steel, stainless steel, and nonferrous tubing—a material already noted for its ability to withstand high pressures and temperatures.

The secret: The soundness and density of the casting are improved by a ceramic mold developed by the Special Products Div., American Cast Iron Pipe Co., Birmingham.

• **Higher Speeds Used**—Called the Acipco Ceram-Spun process, it permits increased spinning speeds—100 to 150 times gravity at the inside surface of the mold (compared with conventional speeds of 50 to 100 times gravity). The higher the centrifugal force, the better the job of squeezing the lighter nonmetallics out of the tube wall to its interior surface from which they can be readily removed in the cleaning process.

But a problem is posed: High centrifugal force tends to cause hot tearing and cracking unless the casting is sufficiently supported. Support is provided by a ceramic mold that's hard, dense, and uniform. Heretofore, Acipco depended entirely upon conventional permanent molds and sand lined molds in producing centrifugal castings.

• **How Mold Is Made**—The ceramic mold is spun into place like a casting. The ceramic material is introduced as a semiliquid into a horizontal flask. Its ingredients: 1. A relatively coarse solid refractory which may include a range of grain sizes. 2. A fine solid refractory flour. 3. A suspending or gelling agent to hold the solids in suspension. 4. Water.

Rapid spinning compacts the solid refractory constituents against the flask wall. Density is about 20 per cent greater than that obtained in conventional sand rammed molds, and uniformity is better than that obtained by ramming against a pattern. Acipco says high speed spinning also assures concentricity of the mold surfaces and the casting.

• **Fine Grained Surface**—In settling under high centrifugal force, the coarser and heavier particles come to the outside against the metal flask, while the finer flour particles are concentrated at the inside surface and give an extremely smooth, fine grained casting surface.

After excess water and gel ma-

Ceram-Spun Heavy Wall Steel Tubing Is Uniform

Example . . . CAST SIZE: OD, 13.80 in.
ID, 4.50 in.
Length, 20 ft

ANALYSIS (percentages): C 0.262, Mn 0.55, P 0.028, S 0.038, Si 0.61

HEAT TREATMENT: Normalized at 1650°F. Tempered at 1150°F.

	Tensile, psi	Yield, psi	Elongation %	% Reduction of Area
Transverse	73,200	49,700	27.3	42.0
Longitudinal	71,500	47,700	27.5	35.8
45 degrees	74,200	50,700	27.3	37.6
Radial	74,700	45,900	36.9	57.0

terial are drained, the mold is ready for oven drying and baking. Flasks with green, centrifugally formed molds are heated in gas fired, car type ovens through a carefully controlled cycle designed to give optimum mold properties.

Accumulation of the coarser refractory materials toward the interface between the flask and the lining is an advantage in venting of mold gases during baking and casting operations, Acipco explains.

Concentration of the finer refractory materials at the inside surface of the mold provides an integrally formed mold facing that is impervious to flaking or spalling.

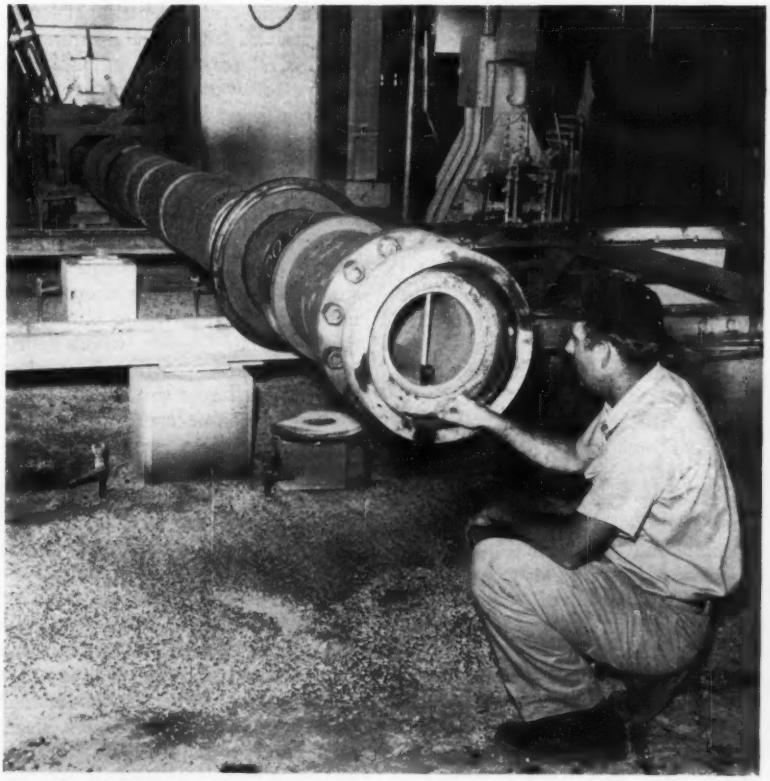
• **Supports Casting**—With a dense ceramic mold in a rigid metal flask, heat from the casting being poured causes expansion of the ceramic material but not of the cooler metal flask. This results in a decrease of mold diameter and consequent support of the rapidly spinning solidifying casting.

Metal is cast from a hydraulically operated machine ladle through a pouring box and orifice located at one or both ends of the flask. Molds are warm when cast on to reduce any chilling effect and consequent tendency toward lapping. Pouring temperatures in the range of 150° F above the liquidus temperature are used for most steels. Pouring weights are controlled by electronic scales mounted under the machine ladles.

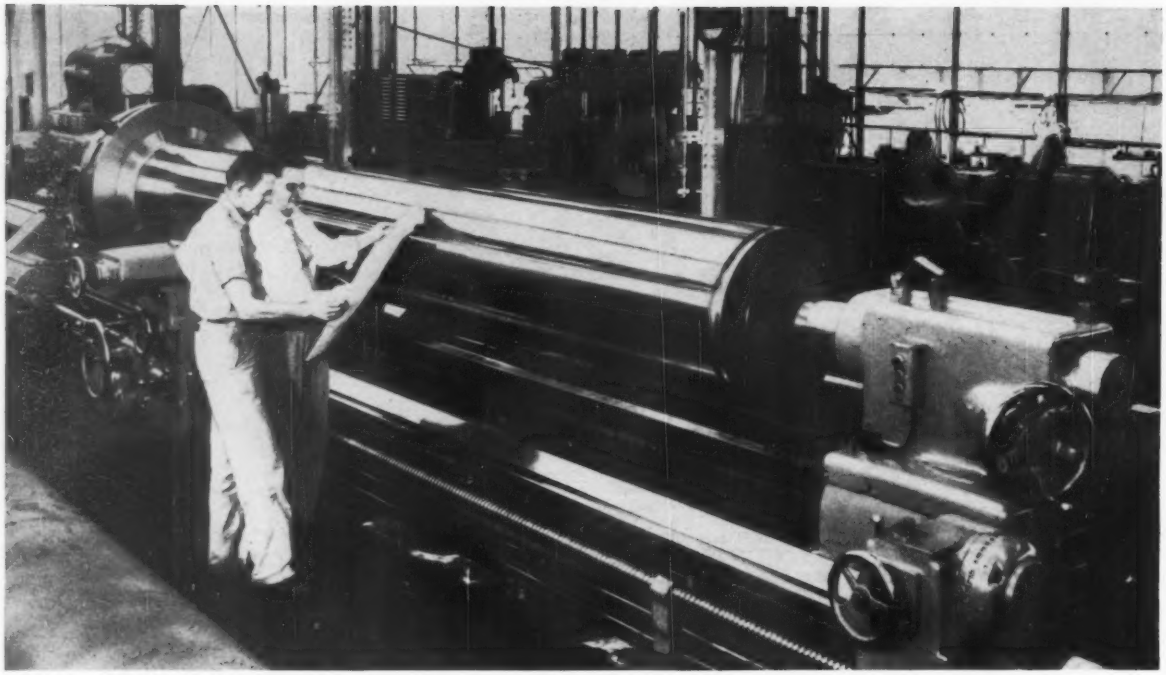
Pouring rates vary with the size and weight of tube being cast, but they must be fast enough to cover the mold wall without lapping yet slow enough so the metal will be "picked up" by the spinning mold as poured.

• **Up to 150 Gs**—Mold spinning speeds are calculated in terms of "Gs" (gravitational units). Spinning speeds that produce a centrifugal force of 100 to 150 Gs at the inside surface are commonly used in the Ceram-Spun process. At 100 Gs, each pound of metal is under a centrifugal force of 100 lb.

Spinning is continued until all the metal has solidified. Then the mold and casting are removed from the casting machine and stripped with a hydraulic ram and tube puller. The ceramic mold material is washed



A ceramic mold centrifugally spun into a flank is examined before drying and baking. Hot metal will be cast into the baked mold and centrifugally spun into a heavy wall tube



A hydraulic ram fabricated from a large, heavy wall Ceram-Spun steel tube is being machined

from the flask by high pressure water, recovered, and re-used to produce molds.

• **Directional Solidification**—When molten steel is poured into a dry ceramic mold, abstraction of heat from the metal is almost entirely through the mold wall. The action induces directional solidification from outside to inside of the wall section and columnar crystallization in the as-cast section. With thicker tube walls and in alloys with a long freezing range, the columnar crystals extend only part way through the tube wall.

After freezing of the columnar crystals from the outside surface, nearly all the remaining liquid metal is at the same temperature. Under these conditions, equiaxed crystals may form throughout the liquid as the temperature gradually falls. The equiaxed crystals are denser than the liquid and are centrifuged outward, against the layer of columnar crystals, until solidification has become complete.

• **Crystals Thrown Outward**—In most steel and alloy centrifugal castings, there is no tendency toward freezing a skin of solid metal on the inside of the wall section while there is liquid metal underneath. Under high centrifugal force, a crystal of solid metal forming at the inside surface is immediately thrown outward through any remaining liquid because of its greater density.

Fluxes, exothermic or merely protective, may be applied to the interior surface of spinning tubes to prevent oxidation during freezing and to produce a smoother inside surface. Such additions, though, are not normally required to induce directional solidification, which is inherent in the centrifugal process when high forces are employed.

With carbon or ferritic alloy steels, the as-cast grain structure is refined by an annealing, normalizing, or quench and temper heat treatment. The grain structure of austenitic alloys is determined by pouring temperature and the solidification mechanism.

• **Variety of Metals**—Acipco makes Ceram-Spun tubes in plain and alloy gray iron, all grades of Ductile iron, carbon steel, low alloy steel, all grades of stainless and heat resistant alloys, and various nonferrous alloys, including cast Monel and 97 per cent nickel.

The tubes can be cast any length up to 20 ft. Longer lengths are produced by welding. If lengths shorter than 20 ft are desired, they can be obtained by stopping off the molds. Outside diameters range from 2 to 50 in.; wall thicknesses 0.25 to 8 in.

• **Choice of Sizes**—Mold diameter can be produced to any given size, depending only on the volume of the lining mix. Inside diameter of the tube depends on the amount of molten metal metered into the spinning mold. This infinite variation in diameter and length makes this process more flexible than any centrifugal method known, Acipco says.

The casting machine operation is programed to vary spinning speeds in accordance with tube diameters and chemical compositions. Based on predetermined schedules, all speeds, speed changes, and times are set up on equipment which automatically carries the casting through the desired cycle. It is pushbutton controlled.

Applications of Ceram-Spun tubing are many. They include hydraulic cylinders and pistons, normal and high temperature pressure piping, rolls, cylinder barrels and liners, retorts, and pressure vessels.

Universities Join Materials Hunt

THE DEFENSE DEPARTMENT is mobilizing the campuses in its hunt for new materials to meet Space Age requirements. Contracts for the program, known as Project Pontus, have been awarded to three universities: Northwestern, Pennsylvania, and Cornell.

The Northwestern program illustrates the unique approach recommended by the Federal Council on Science & Technology: Engineering and the physical sciences pool their talents in a common effort.

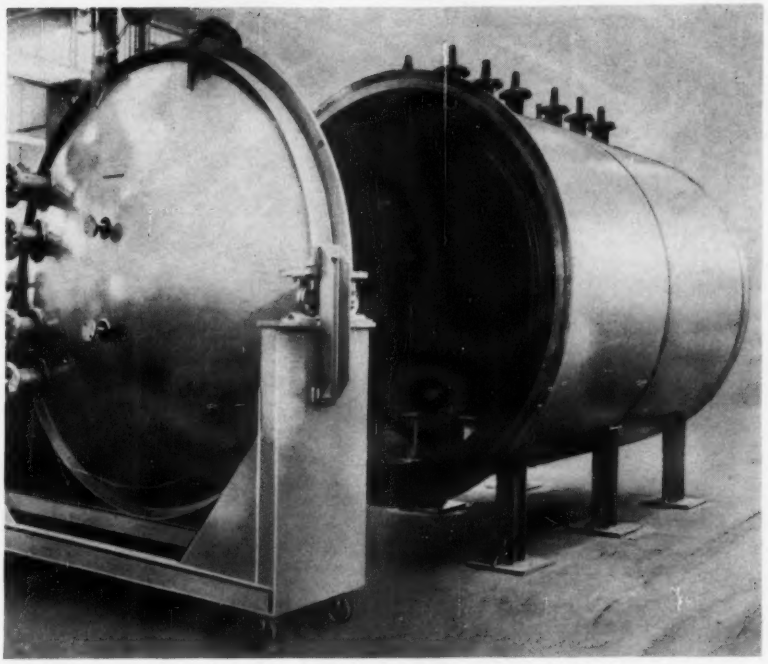
• **Crossfertilization**—Combining the sciences is important for two reasons, says Dr. Morris E. Fine, chairman of the Northwestern Materials Research Center: 1. Material research, traditionally, has been split into many channels, with each science working independently. 2. The material scientist must be familiar with all materials.

• **Scope**—Northwestern will investigate metals, semiconductors, plastics, and ceramics to uncover new information on their properties and behavior. It will not develop new materials.

• **Sponsor**—The Defense Department's Advanced Research Projects Agency is helping to set up the center. Under an agreement between Northwestern and the agency, the center will receive about $3.5 million in federal support during the next four years. By 1964, it is expected the center's funds from private and government sources will reach $2.2 million annually.

Of the other participants: Cornell will receive $6.1 million, Pennsylvania $4.4 million. As the program develops, the agency expects to spend $17 million annually on materials research in universities.

• **Dual Role**—The program will also provide training opportunities. Northwestern has 17 faculty members studying materials; the total is expected to reach 34 in five years. The number of postdoctoral research associates will be raised from 6 to 20, and graduate enrollment will be increased from 70 to 175.



The furnace has a working zone 6 ft in diameter by 10 ft long. It features a removable door mounted on a carriage

Large Vacuum Furnace to Heat Treat ICBM Parts

Capable of operating at 2250° F, it will process high alloy steels used in making the Atlas. Chamber is evacuated to pressures of about ½ micron

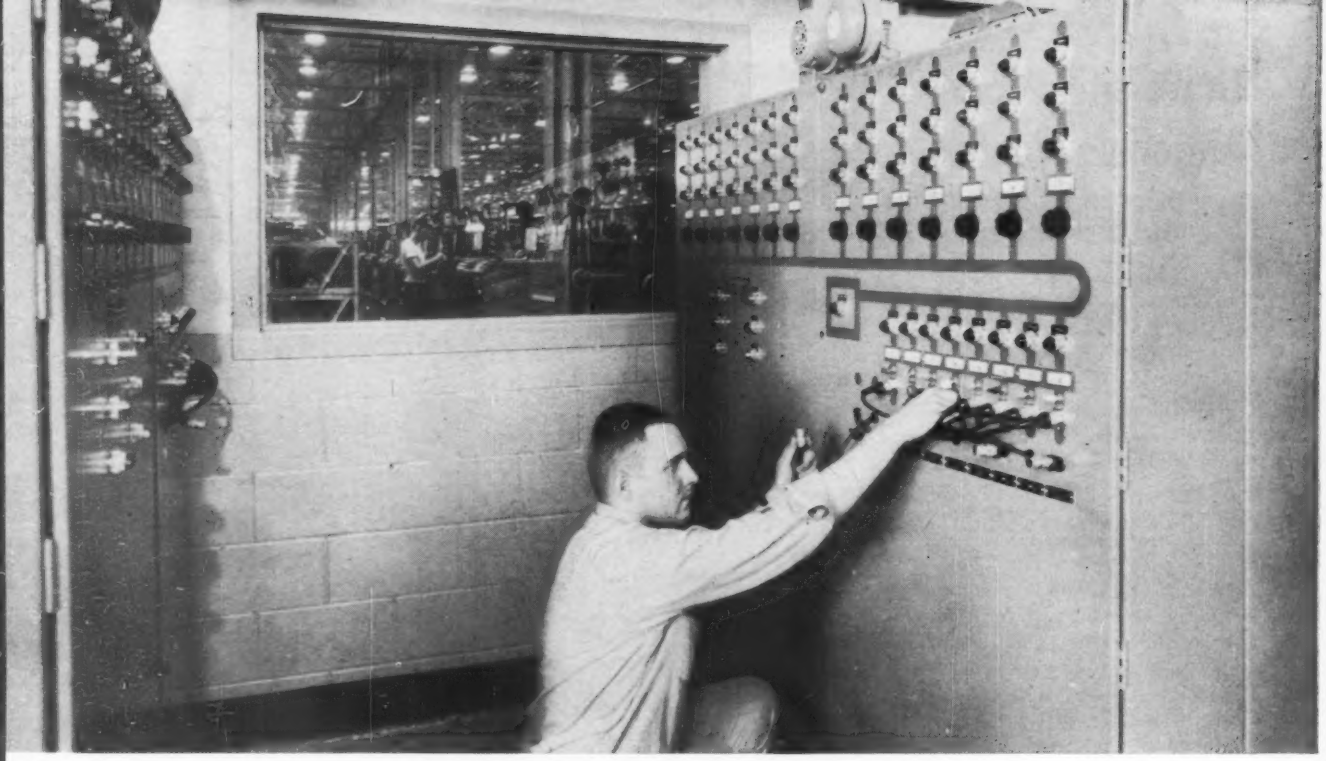
A LARGE, cold wall, vacuum heat treating furnace is slated for installation at Convair Astronautics Div. (San Diego, Calif.) of General Dynamics Corp.

It will heat treat and braze high alloy steels under high vacuum at temperatures over 2200° F in the production of Atlas intercontinental ballistic missiles.

The furnace, built by F. J. Stokes Corp., Philadelphia, is capable of operating at 2250° F. A chamber 9 ft in diameter and 12 ft long is evacuated to working pressures of about ½ micron; within the chamber is a uniform temperature work zone about 6 ft in diameter and 10 ft long.

The chamber is fully water jacketed. Multiple layers of reflective material provide radiation shielding around the work zone. For rapid cooling of the workpiece, inert gas is circulated through the work zone by a large capacity fan.

To minimize floor space, the heavy door, nearly 10 ft in diameter, is mounted on a carriage so that it can be backed away from the chamber and rolled to one side when loading and discharging.



An operator makes plug-in connections that direct automatic line through a prescribed flow sequence. Dials are used to program plastic pellets of a specific color for delivery to selected extruder stations for coating and sheathing operations

Air Conveyors Feed Wire Coaters

Bulk handling system picks plastic pellets from a battery of collapsible shipping containers, then whisks them through an intricate traffic pattern to 61 working stations

AUTOMATIC handling and "tandemized" manufacturing are used in wire insulating and sheathing operations at Western Electric Co.'s new Omaha, Nebr., Works.

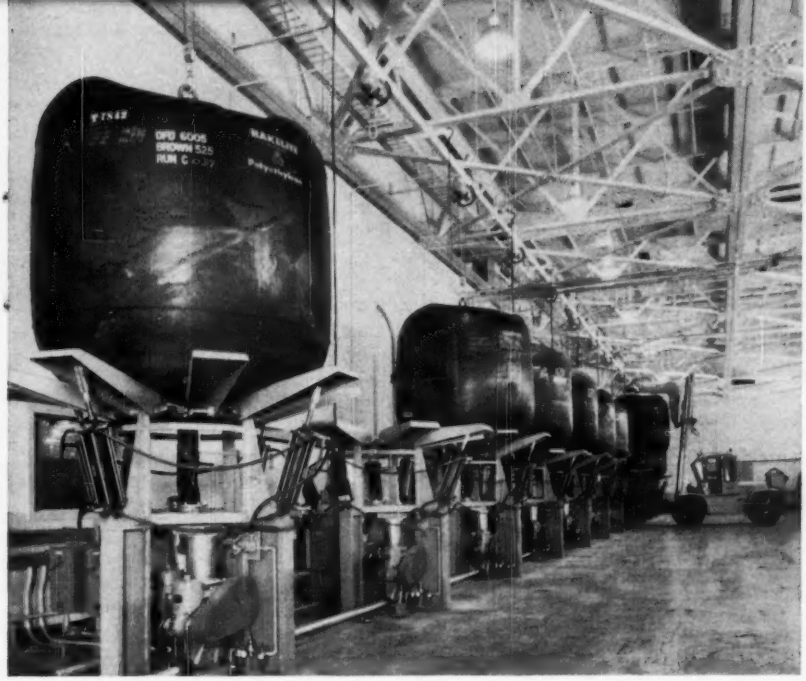
The system permits the processing of 2500 ft of exchange and switchboard wire a minute, has eliminated the need for permanent storage facilities, and has contributed toward an equipment savings of $600,000.

• **Conveyor System**—Eleven Dracco Airstream conveyor systems, managed by a single operator who monitors static panelboards, keep production stations constantly supplied. More importantly, they automatically supply designated process stations with pellets of the right color at the right time.

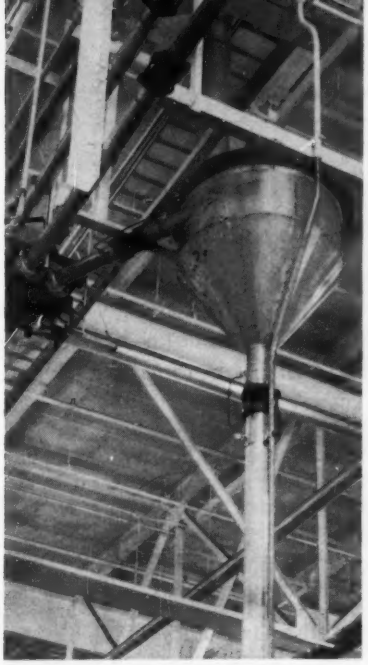
Different colored polyethylene and polyvinyl chloride (PVC) pellets are selected (directly from the shipping containers), unloaded, and distributed to 61 coating sites at the rate of 2225 lb an hour. In a week, almost 500,000 lb of pellets are propelled through the conveyor system at distances of up to 800 ft at turnpike speeds.

• **Integrated Operation**—The system is integrated with tandemization, a manufacturing innovation at the Omaha plant. The technique combines several wire making processes, formerly done separately, into a single, continuous operation. Through conventional machines linked in series, wire is drawn to specified gages, annealed, insulated, cooled, tested, and reeled. Products are small gage wire for switchboard assemblies and larger wire for exchange systems. Exchange wire is grouped into cables and covered in the cable sheathing section. Single line processing provides nonstop manufacturing, better product control, and eliminates the expense of storing and rehandling materials between manufacturing steps.

The conveyor system serves two major processes — wire insulating and cable sheathing. Exchange wire is coated with various colors of polyethylene on 42 extruders in the insulating area. The system also moves neutral PVC to machines



This battery of cradles holds collapsible rubber containers filled with polyethylene. Cradle arms adjust pneumatically to bags as they empty. Stainless steel rotary feeders direct pellet flow into aluminum air conveyor lines



These air operated diverter valves are electrically controlled from the central panel board. They direct flow from main lines into cyclone receivers

producing switchboard wire in the same production area and black polyethylene to six cable sheathing extruders.

• **Shipping Containers**—All conveyors deliver pellets directly from Sealdbins that have a capacity of 10,000 lb. Three conveyors move colored polyethylene to the wire extruders. Three deliver black polyethylene to six sheathing extruders. Three conveyors deliver neutral PVC to 13 extruders producing switchboard wire. Two deliver gray, ivory, or beige PVC to two switchboard jacketing extruders.

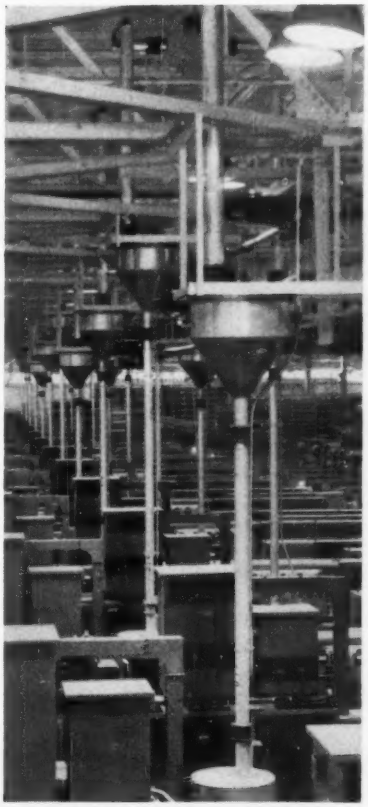
The Sealdbins, collapsible rubber containers, are mounted on large cradles. Multiple conveyor lines running under the cradles receive the contents and pass them on to processing. Two or more conveyor lines servicing each container battery permit flexibility in flow sequence. If there is heavy demand for a given color, for instance, it is answered quickly and efficiently because more than one bin can be drawn upon. Also, one bin can handle the color requirements of several stations.

• **Advance Programing**—Manipulation of a series of plugs on switchboards sets up the flow sequence for tons of a specified type and color of pellet to one or more of the 42 wire extruders (or black to the sheathing extruders). Switch panels located in each receiving room actuate the polyethylene and PVC conveyors.

When production requirements are scheduled, data regarding color selection and destination are entered manually on the switchboards. The rest of the movement is automatic. Until the program is changed, the operator merely monitors hopper and bin level indicators on the panels and makes sure replacement bins are available.

• **Traffic Control**—Air operated diverter valves automatically direct flow from the main conveyor lines to the proper extruders. When an extruder is filled, flow passes on to another scheduled for the same color. A flow of a different color may follow shortly, but there is no danger it will mix with particles of the previous flow. The system is self-cleaning and does not require a purge between colors.

Centralized electronic control enables the system to supply itself. When the supply level of an extruder drops below a critical point, the information is relayed automatically to control, and the supply is immediately renewed.



Material flow is automatically switched from main conveyor lines overhead into cyclone receivers, then down gravity chutes to hoppers on the extruders that coat exchange wire

Machine Tool Prices Will Go Up

Low profit margins in the industry force builders to lift prices during the second half of this year. If buying surge comes, look also for longer delivery times

IF you expect to buy more machine tools later this year (and most metalworking executives do), you'll probably have to pay more for them. A fair guess is that 10 per cent will be a typical boost. The price changes will come despite the fact that there is tough price fighting in some machine lines, such as engine lathes.

Most builders will be selective about the boosts—they'll hold the line on machines where the profit margin is reasonable. Some of the price increases are already in the works.

• **Why Now?**—Despite a fair level of orders for most companies, profits are extremely low. Some builders are operating at a loss. Others are making a profit of less than 5 per cent of sales.

Some prices were established three or four years ago. Since then, there have been at least three increases in labor costs. Materials and other costs have risen too.

Builders also have little chance to produce in quantity, so their efficiency is down. One told STEEL: "We know what economical lot sizes are for our models, and in all cases, we are manufacturing in lots smaller than the optimum. This costs us a lot. Yet we can't afford to manufacture in economical lots because we'd be producing for inventory—and we would be taxed on the inventory."

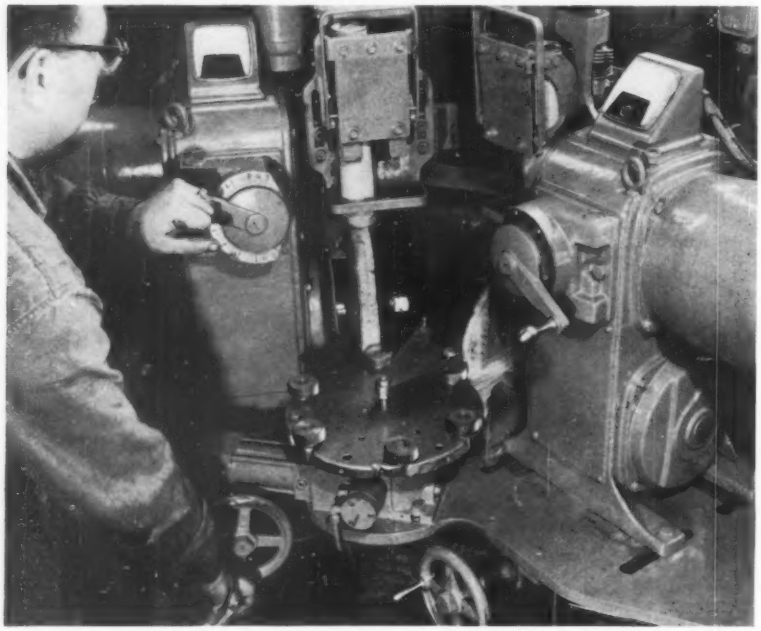
The Machine Tool Exposition—1960, Chicago, Sept. 6 to 16 (and the two other Chicago shows at that time), will provide the industry with the timing. New models will be unveiled—they will have no price history. Most other models will be modified. The re-do or introduction of these models gives the builders a pricing chance that they can't afford to pass up.

• **Deliveries Up Too**—Nearly all machine tool builders expect an increase in orders in the fourth quarter. The exposition comes at a time when most users need new machines and say they intend to buy them (STEEL, July 11, p. 45). The expositions, with all the attendant publicity, will have users more machine tool conscious than they have been since the 1955 shows.

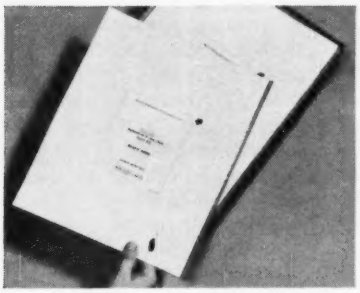
With the increase in orders will come a delay in deliveries, even though the industry obviously has excess capacity. But it exists only in bricks, mortar, and machines. The labor force, including skilled technicians, has been trimmed in nearly every machine tool plant. When new orders start to pick up, builders will begin to add to their labor force, but there will be a delay (one builder estimates at least six months) before the manhour capability is restored to a level that will satisfy the anticipated demand.

• **Worth It?**—Builders are satisfied that the new machines will perform enough better than their predecessors to enable users to justify the increased price and longer deliveries.

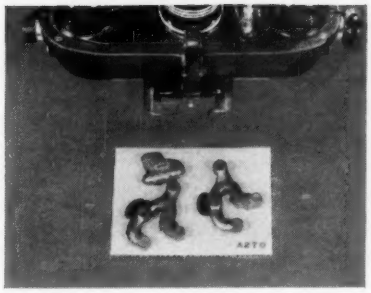
Here are just a few of the developments they're talking about: 1. Horsepower and rigidity on standard machines are going up, so you'll be able to take more metal off per minute. 2. Numerical control, plus other control and setup improvements, will make many of the machines more versatile than they have ever been. 3. Press production rates are in for a jump. 4. Some new machines are aimed directly at superprecision requirements, will hold tolerances a fraction of what has been expected from them.



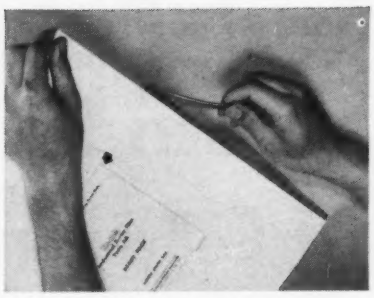
ADJUSTABLE SPEED DRIVE in this buffing machine reduces brush wear in the removal of sharp corners from small gears. The unit, developed by General Electric Co.'s Gear Motor & Transmission Components Dept., Paterson, N. J., is reported to cut operating costs about $5000 a year



1) No darkroom loading. Ready for exposure as it comes from the box.

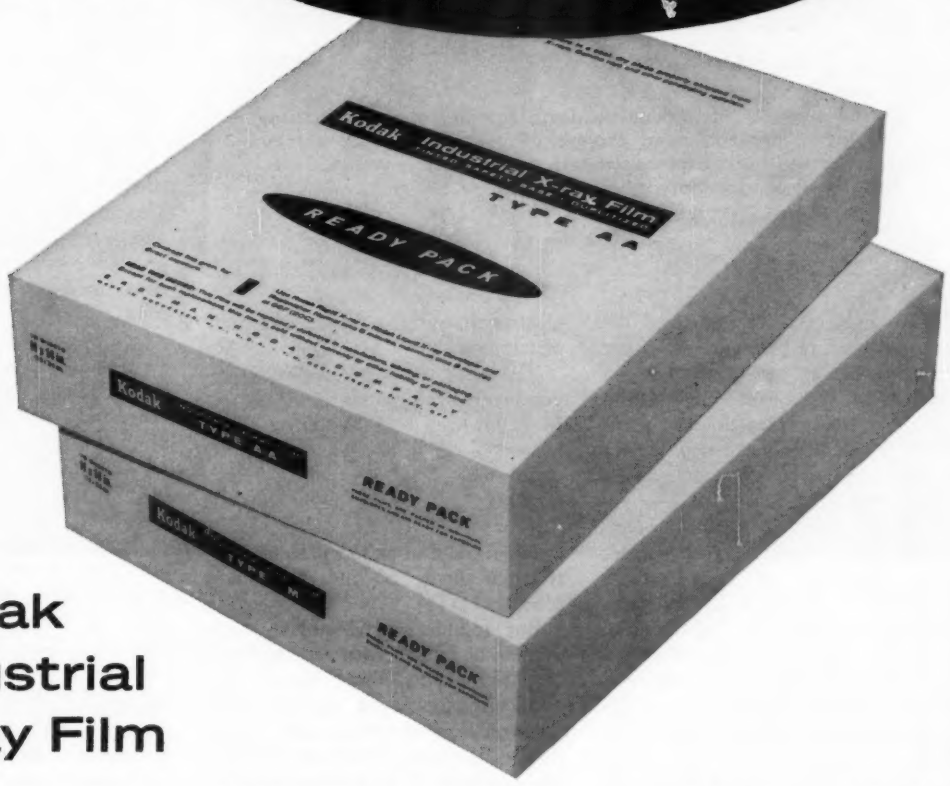


2) Just place in position and expose —the film is protected from dust, dirt, light and moisture.



3) In the darkroom, pull the rip strip, remove film, and process.

...NEW!... READY PACK ....



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TRADE MARK

Founders Hear Comparison Of Converters, Electrics

CAPITAL COST (per annual ton)

Electric Furnace	$20.20
Cupola-Converter	22.80

PRODUCTION COST (per ton)

Electric Furnace	$57.03
Cupola-Converter	59.09

Capital costs do not include buildings, foundations, casting cranes and ladles, or engineering charges. Production costs do not include general works expense, interest, amortization, insurance, taxes, supervision, or laboratory or casting cost.

STEEL FOUNDERS may find the combination of basic hot blast cupolas and oxygen converters an economical source of carbon and low alloy steel for castings in areas where low cost electric power isn't available.

Production costs and other factors in the making of steel in converters and in electric arc furnaces were compared at the Castings Congress & Exposition, American Foundrymen's Society, Philadelphia, by F. E. Van Voris, metallurgical engineer, and John Crane, engineer, Union Carbide Metals Co., a division of Union Carbide Corp., New York.

• The founder's choice of a metal source will be influenced by the grades of steel to be made and the required volume of castings.

The trend: Use of the basic hearth to make steels with less phosphorus and sulfur for higher impact properties and electric arc furnaces because of their economy and flexibility. The oxygen converter hasn't proved itself as a source of metal for castings, but foundry operators may be attracted to the method because of the low phosphorus-sulfur-nitrogen content of its product.

The first use of the basic oxygen process to produce steel for castings may well be in a foundry that is part of an integrated steel plant, where molten pig iron and low cost tonnage oxygen are available, say the experts. It is doubtful that foundries will abandon present electrics in favor of the pneumatic process.

But founders producing a high volume of carbon steel castings may be interested in combining cupolas and converters; such a setup offers an even flow of steel to the casting floor. Foundries interested in making castings of gray iron, Ductile iron, and steel may also find the combination attractive.

• Both melting methods offer clearly defined advantages.

Electrics might win the nod with founders because they are standard in the industry and would require no new operating skills, say the engineers. They can be started and shut down easily, and temperature control methods are well established. Alloy elements can be recovered from scrap. And the electrics can make all ranges of carbon and alloy steel—including stainless and heat resistant grades.

But the converters can make heats of 3 tons or less, providing more continuous flow of steel to the casting floor—a possible advantage in the high volume foundry. Intermittent operation is possible; the furnace can be heated with a gas burner during shutdowns. And cupolas could be used to produce gray or ductile iron.

Phosphorus and sulfur content of the basic oxygen steel is said to be no more than that of the electric furnace product; nitrogen content is said to be lower.

• Hypothetical installations help in comparing pneumatic and electric processes.

Mr. Crane and Mr. Van Voris compare a foundry using a basic, water cooled cupola and a converter (similar to the setup at Acme Steel Co., Riverdale, Ill.) with a basic, single slag, electric furnace shop. The comparison considers operating and metallurgical aspects of the processes; it also takes capital, material, and operating costs into account.

For convenience, hypothetical installations producing grade B, carbon steel castings are studied. They are assumed to be in the Philadelphia area to establish raw material costs. Each plant has an assumed output of 100 tons of steel a day, 250 days a year. Costs for buildings, ladle cranes, and crane ways aren't considered.

The electric furnace shop is assumed to have a 4 ton and a 6 ton furnace. The basic oxygen shop uses a 5 ton converter and is equipped with a spare vessel.

• Studies indicated higher material and capital costs for the cupola-converter shop.

Investment in melting equipment for the basic oxygen shop was shown to exceed that for the electric furnace installation by about $2.60 per annual ton of steel capacity. Comparison of yield, cost of metallics, and other material or operating costs gives the electrics an additional cost advantage of about $2 per ton of steel produced.

In areas where power costs are high, the cost balance would be more favorable to the pneumatic process.

FIVE-DEEP

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Five Extra Values in Depth

1. **Technology**—many million dollars a year, invested in UCM's 600-man research and development center—helps you produce more profitable metals. The payoff has been progress—over 100 new alloys and metals—providing countless ways to improve your products.
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3. **Global Ore Sources** assure you uninterrupted supplies of ferroalloys. UCM's close association with many mines throughout the world provides dependable raw material sources.
4. **Unmatched Facilities** free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.
5. **Strictest Quality Control**—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

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Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

Oil treated samples are clipped to the underside of ¼ in. thick quartz plates and exposed to ultraviolet light to accelerate staining process

Rust Preventives Tested For Staining Qualities

Republic researchers offer a means of predicting how long cold rolled steel sheets protected with various rustproofing oils can be stored without staining

A TEST that measures the staining properties of rust preventive oils used on cold rolled steel is under development at the Independence (Ohio) Research Center, Republic Steel Corp. The test, devised by Donald E. Babcock, Edwin P. Kawasaki, and Keith M. Montgomery, is said to simulate in one week oil stains that take two months to a year to develop on steel sheets in storage.

Calibrations are being compiled for prediction of safe storage time for steel coated with various oils. To date, more than 60 oils have been tested.

The test will permit the staining properties of oils now used to be determined in the laboratory, rather than in the field, where testing is more costly, says Republic. Availability of data predicting staining time should be helpful to steel producers and users until truly stainfree oils can be developed.

• Staining of test panels is accelerated by exposure to ultraviolet light.

Cold rolled, steel test panels (about 1 by 1¼ in.) are vapor degreased, scrubbed in a hot caustic solution, washed, and dried. A drop of the oil under test is applied to one end of the panel. Test panels are then fastened to the underside of a ¼ in. quartz plate with a spring clip. A piece of light gage, Nichrome wire is placed between the test panel and the quartz, at the opposite end of the panel from the oil drop, to maintain a definite line of contact between the plate, the panel, oil, and air.

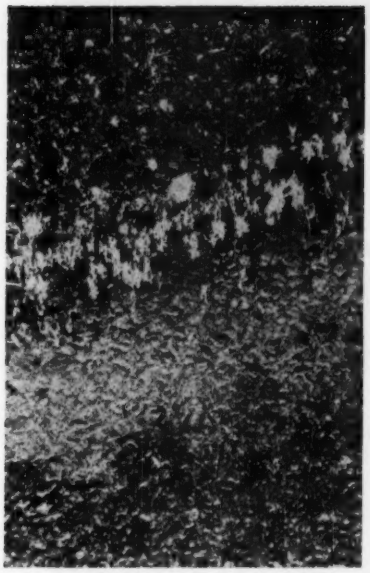
Oil on the panels is irradiated with ultraviolet light. At first, the light source is held 8 in. above the plate; intensity of the light is held constant, as the lamp ages, by varying the distance between the lamp and the quartz plate. The lamp raises the temperature of the steel to about 100° F.

After ultraviolet exposure, test panels are vapor degreased and inspected for permanent stains, which take the contour of the line of contact. Magnitude of the stain and the time it takes to appear can be correlated with the severity of stains on steel in storage.

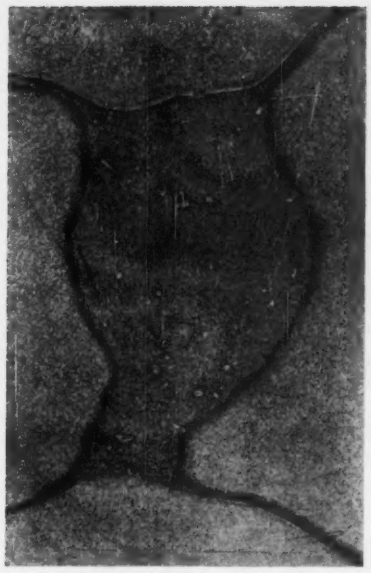
• Staining has long been a problem in the storage of cold rolled sheets.

The length of time it takes stains to appear is said to vary with the types of rust preventives used and the conditions under which the steel is stored.

The yellow-brown discoloration is difficult to remove or paint over. It renders most steels unusable. Sheet stock stacked in storage is flexible; weight of the layers in



Oil stain on cold rolled steel after six months' storage — magnified 18 times—consists of hydrated iron oxide (intermittent white areas at top) and an oil stain deposited after oxidation (continuous band at bottom)



Steel specimen shows stains from No. 2 pale oil after one week exposure to ultraviolet light in the laboratory. Temperature of the steel-oil-air interface (necessary in the staining process) was held at 100° F

bundles presses sheets together, causing uneven contact between them. The result: Heavy and light areas of rust preventive oils. The stain pattern tends to correspond with the heavy and light areas of oil coating, say the researchers. And adjacent sheets have the same stain pattern—one is the mirror image of the other.

• Tests indicate that steel-oil-air contact is needed to produce the stains.

Samples that didn't satisfy those conditions didn't develop stains, in tests that lasted two weeks or more; that may explain the random distribution of stains on stored sheets, say the experts. A stain may form where steel-oil-air contact exists in the stacked material, but a uniform coating of oil prevents formation of the oil-air interface between the sheets and accounts for the lack of staining.

The degree of staining on specimens depends on the length of the test and the degree of unsaturation of the oil used, say the researchers. Unsaturation of the rust preventives that stained the steel is about twice that of the oils that didn't stain, Republic reports. The staining is thought to be caused by oxidation of unsaturates in the protective oils.

Formerly, it was thought that residual ferrous sulfate on cold rolled steel was catalyzing the staining reaction. That theory was tested by cleaning panels carefully before testing them, then applying ferrous sulfate. Stains of the same magnitude were produced, with or without the ferrous sulfate treatment.

• Microscopic study shows the stains to be in two phases; the steel surface under the stain is etched.

One stain phase is a yellow-brown deposit, which Republic identifies as hydrated iron oxide, or rust. Tests indicated the presence of ferric iron in the oxide.

The other phase consists of a broad, white band, containing 10 per cent anisotropic, crystalline aggregate, with an index of refraction of 1.45. The remaining 90 per cent is isotropic, with an index of refraction greater than 2.11.

No free metal was detected on the stained area. The white band adheres tenaciously to the metal and is insoluble in water or in common organic solvents. An oxidation product of the oil, it is probably a stable polymer and can be removed only by pickling, say the researchers.

New Theory Blames Hydrogen for Rust

HYDROGEN ions, or protons—basic building blocks of all matter—are the real causes of rust in iron, suggest Dr. Earl A. Gulbransen and T. P. Copan of the Westinghouse Research Laboratories.

Their theory is that the hydrogen ions (they come from water vapor) penetrate the iron and enlarge the sites at which oxygen normally combines with the metal, the reaction spreading throughout the surface of the metal, resulting in rust.

• Dr. Gulbransen says two control measures can be identified.

"Hydrogen must be prevented from entering the metal.

"The growth of the localized reaction sites must be inhibited by the addition of suitable alloying elements to the iron."

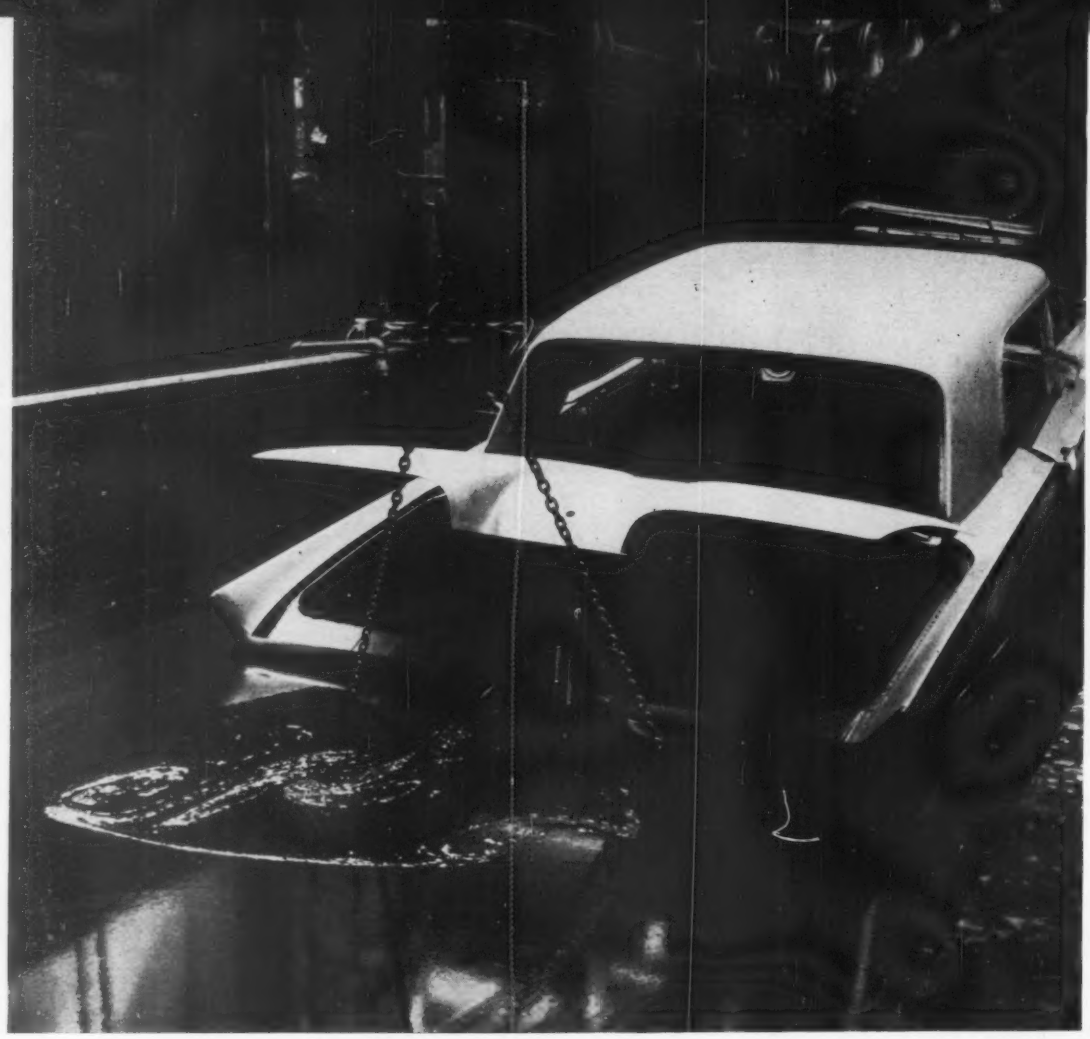
Those measures are suggested in addition to any electrochemical effects involved in iron rusting. (Electrochemical reaction has been a standard explanation for iron corrosion.)

• Experiments show that moisture equivalent to a 3 per cent relative humidity at room temperature will cause rust producers to form.

Pure iron wires, about as thick as a thread, were reacted with oxygen and water vapor at 835° F. With dry oxygen, the iron forms a protective oxide coating from which grow billions of round oxide whiskers. Each whisker grows from a single, specific growth site.

With water vapor substituted for the dry oxygen, thin, blade shaped platelets of iron oxide erupt from the growth sites and spread across the metal surface. As they grow, they spread more than 50 times in area over the sites observed with dry oxygen.

"We conclude that the hydrogen ions in the water vapor enlarge the areas of chemical reaction between the oxygen and iron and bring about the metal's greatly increased corrosion," Dr. Gulbransen declares. "At the lower temperatures at which iron usually rusts, this basic reaction is masked."



Thunderbird body going through dipping primer is typical of the extent to which auto firms rely on water reducible paints. Tank holds 8000 gallons

Water Based Paints Called Finish of Tomorrow

Experts say they are among the most important developments in finishing. Here is a lot of the information you need to compare the system with the one that you are using

WATER reducible paints appear to hold great promise as the finish of tomorrow, says Glidden Co., Cleveland.

The company gives these reasons:

1. You can put on more paint in one coat than you can with other systems.

2. High molecular weight resins mean better quality, plus a longer life.

3. A water solvent is not toxic or flammable, and it's cheaper than other types.

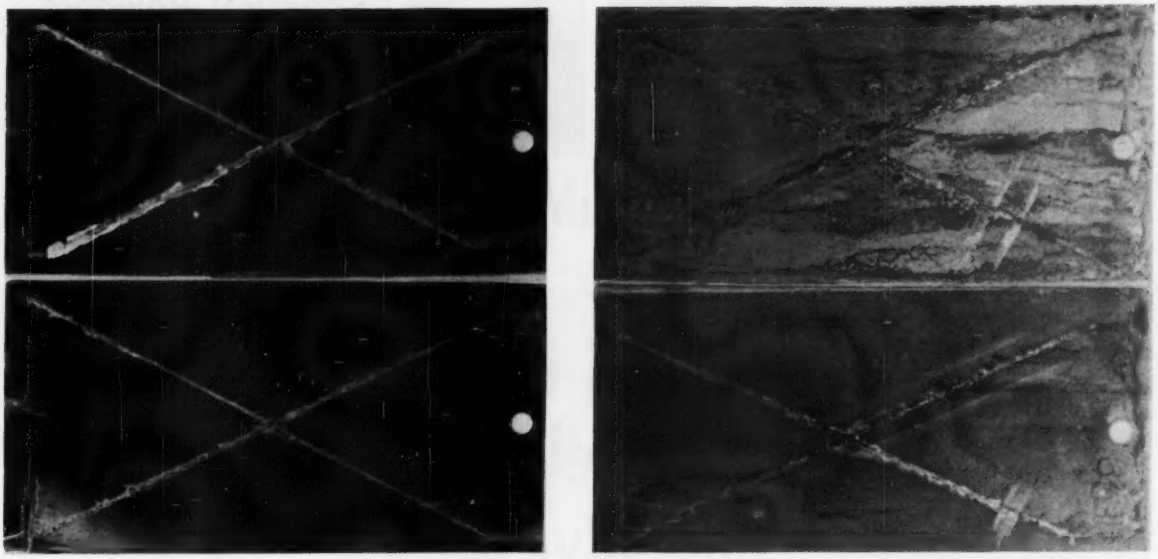
4. Costs are comparable with those of solvent-type paints.

5. Water based paints are now available in a gloss finish.

• Auto firms have been among the first to take advantage of such finishes.

They're proving to be most practical in handling unitized bodies, says R. V. Hudson, Glidden's technical service manager. At Chrysler, they form the base for four protective coats. For several years, Ford has dipped car bodies to get maximum protection in inaccessible areas. Several General Motors divisions employ them on specialized parts.

Water reducible finishes permit a



Comparison of epoxy primer (top) with water reducible primer demonstrates superior resistance to corrosion after 288 hours in a 5 per cent salt spray at 55° F

paintmaker to supply a large polymer, high solid, low viscosity coating, says Glidden. For example, suppose you dissolve a "heavy" resin in some solvent and spray it on a metal. After the solvent evaporates, you might have a 30 per cent solid deposit. By going to a water base, the solid portion increases to 50 per cent, claims Glidden.

High solid content is particularly helpful in coating hidden, hard-to-vent areas. Once the workpiece is out of a paint drying oven, cooling metal condenses trapped vapor which runs, washing clean the sections that need protection most. When water types are used, the condensate hardly affects the deposit, increasing coverage.

Glidden also points out that it's desirable to have a more complex molecule in a paint coating because it has been proved more resistant to corrosion, air, chemicals, and other deteriorating environments.

• Since several types of water reducibles are available, you ought to consider some basic rules before you decide on the kind of finish needed. Here are four outlined by Glidden experts:

1. What do you expect the finish to do? Must it resist weather, chemicals, or abrasion? Or will it be used out of sight indoors? There's a great deal of difference in price and quality among the many general types of water reducible finishes. Generally, high solid content in a finish gives greater protection—that's a strong point for water reducibles.

2. Look at curing devices. Do you have a large investment in infrared or air drying ovens? If you have none, it will pay to consider one when turning to water reducibles, especially when production speed is a factor. (Water evaporates less readily than volatile solvents.)

3. Metal preparation is as important as it is for any other paint system. Look carefully at: Alkalies, trichlorethylene, steam, burnoff, and wiping methods. Remember, says Glidden, you can get grease off, but the residue must be considered even in systems with seven stages.

Some formulas of water reducibles can be applied directly over slight amounts of some oils.

Phosphatizing improves finishing results.

Shotblasting and rotary blasting often improve paint adherence. Even so, you must watch finish—more than one coat may be necessary to give the smoothness required for some consumer products.

4. You need help with the geometry of the part you are making. The method you choose for applying the paint has a lot to do with how expensively or cheaply you can finish the product.

An example cited by Glidden: Home laundry equipment. You can't spray such items readily on a conveyor line because spray tends to blow back out of openings. Wet or flat coating is usually employed, says the company.

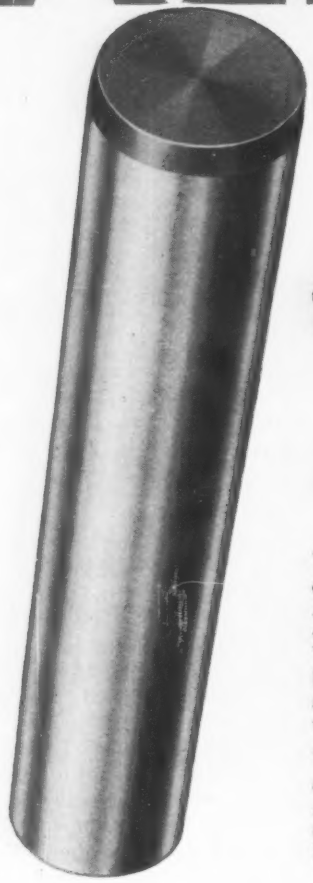
• Suppose you're using solvent paints and want to switch to water emulsion types. Here are a few more points to remember:

Present equipment isn't always satisfactory for the new emulsions. Pumps, for example, may not be able to handle water as well as solvents; packing glands may have to be changed.

Cycling times are always important, and various baffles might have to be introduced in long tunnel arrangements to provide proper degrees of drying.

A spray gun that gives you adequate coverage with a solvent based paint will deliver too much water emulsion. Water types also have high foaming characteristics which have to be watched and compensated for. Agitation is also important.

ALLEN



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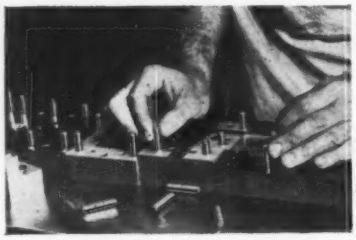

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Spherical Powders Produced New Way

A PROCESS for producing spherical powders from metals and their alloys with a uniformity rate of 98 per cent has been developed by Linde Co., a division of Union Carbide Corp., New York. The range: 20 to 150 microns.

Produced in a totally inert atmosphere, the particles are free of voids, cavities, and inclusions.

• **Applications**—The company says such powders may be used to fabricate sintered bodies requiring controlled porosity, as in filters, burner plates, and porous piston rings.

A 10 to 20 per cent addition of spherical particles may improve the flow of angular powder particles into molds and improve the quality of sintered powder parts.

Highly reactive powders may be handled with less hazard when they are spherical and have the lowest possible surface-to-volume ratio.

Using standard procedures under inert atmospheres, Zircaloy -2 wire has been converted to powder. The process may be suitable for other reactive metals.

Addition of spherical powder additives (like aluminum) may improve burning stability for solid fuel rocket propellents.

In the laboratory, spherical powders can be accurately separated into particle size ranges, and the samples can be used to calibrate powder analyzing equipment.

Six powders are available in limited quantities from Linde's Crystal Products Dept. (They are copper, aluminum, nickel, 316 stainless steel, tungsten, and Nichrome.)

Porous Nylon Takes Wear

A family of porous nylon parts is tailored for jobs as bearings and wear parts where low frictional lubricated surfaces must be maintained over indefinite periods without subsequent lubrication.

Made by Polymer Corp., Reading, Pa., the parts absorb 15 to 25 per cent of oil by weight. The company says they will hold the oil under extremes of pressure, temperature, and acceleration.

Horizontal Boring Mill Controlled by Pendant

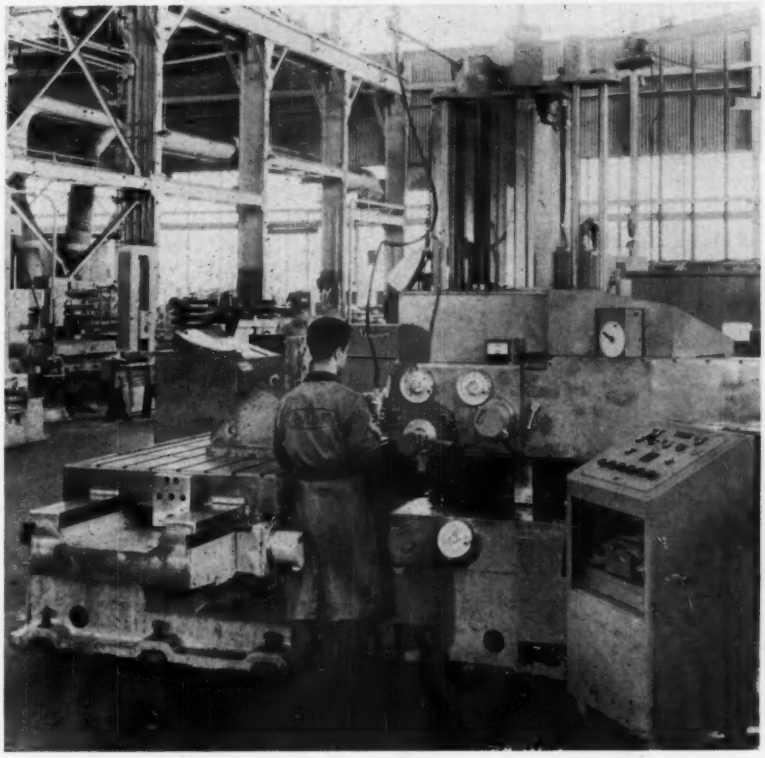
A SERIES of horizontal boring mills has two finger control over variable speed traverse and feed engagement. Made by Bullard, the machines come in 3, 4, and 5 in. spindle sizes.

The work and tool are easily and accurately positioned by clock type dials and variable traverse rates are controlled through a portable pendant. The pendant puts machine control in the operator's hand.

The company says the Dynamill (compared with its predecessor, Model 75 H.B.M.) has greater accuracy, increased rigidity, takes up less space, but does not sacrifice machining capacity.

Another development from Bullard is a variable speed drive now being used for the Dynatrol vertical turret lathes (where variable speed requirements exist). The drive is a mechanical, hydraulic type. It provides selective and adjustable infinitely variable speeds without steps or interruptions.

For further information, *write* Bullard Co., Canfield & Key Streets, Bridgeport 9, Conn.



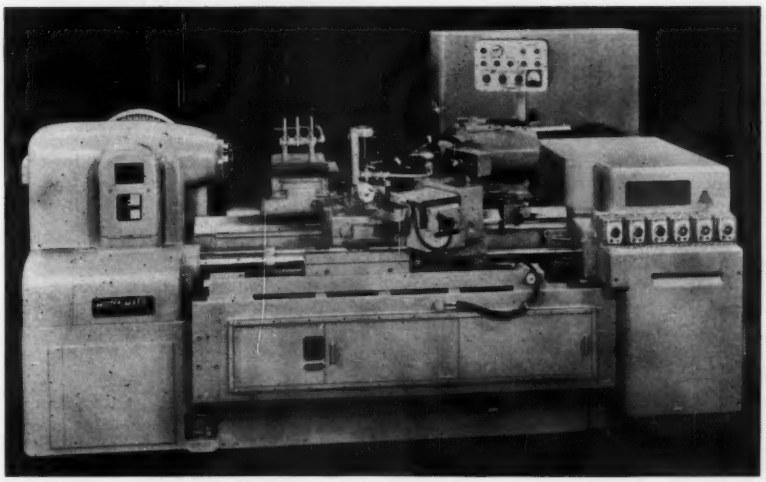
High Speed Production Lathe Has a Four Cut Cycle

WORKPIECES requiring heavy stock removal can be handled by the Model 21-H Mona-Matic production lathe. It can be equipped with a four, two, or one cut cycle.

The Air Gage Tracer system operates on the precision air gaging principle and controls the hydraulic tool slide from a master template. Stylus pressure on the template is 5 to 6 ounces. Template shape can be reproduced within ±0.001 in.

Feed rates are infinitely variable from 1 to 40 in. per minute. Carriage traverse is 200 in. per minute. Facing and forming slide feed rate is ½ to 20 in. per minute and traverse is 90 in. per minute.

Five different feeds are available



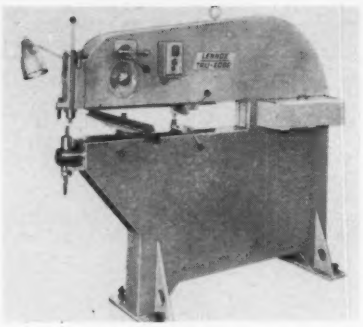
to the carriage for all cycles. When equipped with a two speed motor drive, one additional feed is provided for the low side cut. Top speed in the three spindle speed ranges is 2760 rpm. The drive motor has a 30 hp rating.

A rear mounted facing and forming slide is furnished for auxiliary machining operations. You can get 18, 30, and 42 in. center distances. The swing over the bed is 15 in.; 9 in. over the front slide; and 9½ in. over the facing and forming slide. Extra equipment includes a two position, automatic hydraulic turret, automatic chip and coolant guard, and a chip conveyor system.

For further information, *write* Monarch Machine Tool Co., Sydney Ohio.

Shearing, Piercing Unit Has 49¼ in. Throat Depth

WITH THIS unit you can cut in the center of a ¼ in. mild steel plate without a starting hole. It



cuts straight, circular, inside, or irregular shapes, slots and louvers, as well as performing beading, planishing, flanging, edge bending, joggling, nibbling, and hole piercing operations.

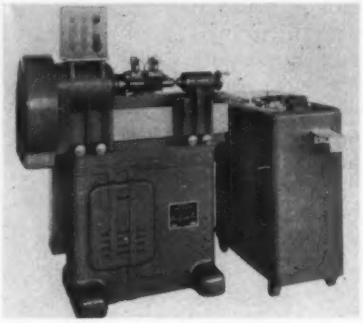
Improvements include a simplified stroke adjustment with a positive stroke scale and placement of all controls on one side of the machine. The unit has a maximum edge cutting capacity of 1 gage in mild steel plate and 5 gage in stainless steel. Throat depth is 49¼ in., permitting circle cutting up to 48 in. in diameter inside the throat.

It operates with a reciprocating upper and stationary lower tool. Cutting speed goes up to 36 fpm. You can make 1750 to 3500 cuts per minute.

For further information, *write* Dept. 159, Lennox Tool & Machine Builders, a division of Lennox Industries Inc., Lima, Ohio.

Lead Analyzer Checks Hobs, Gears, Cams

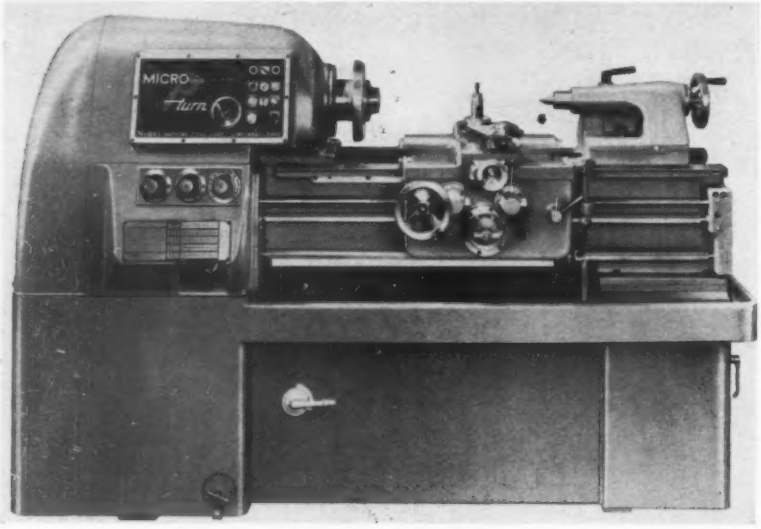
A LEAD analyzer inspects and electronically records lead measurements on hobs, helical gears and splines, worms, screws, cams, taps, form milling cutters, and multiple thread milling cutters.



It's suitable for checking and recording lead of thread, or lead of spiral gash of gear hobs. The lead of both sides of the thread is checked and charted simultaneously. Leads of spiral gashes on form milling cutters and multiple thread milling cutters can also be checked on the machine.

It can handle tools or parts up to 16 in. long and 9 in. in diameter. Maximum transducer slide travel is 8 in. Floor space requirements are 30 x 44 in.

For further information, *write* Star Cutter Co., 34500 Grand River Ave., P. O. Box No. 376, Farmington, Mich.



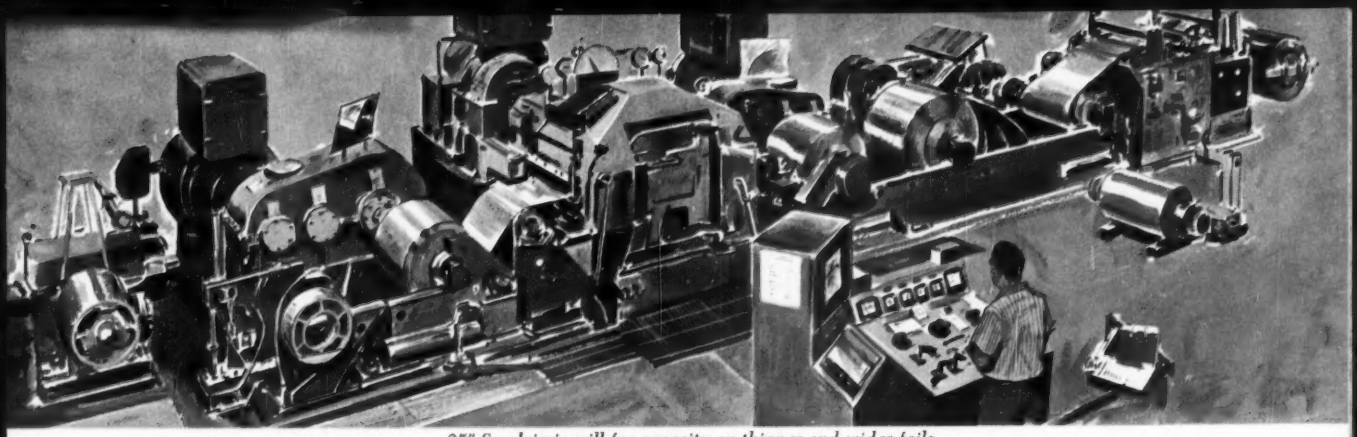
A 5 HP MAIN DRIVE UNIT ON THIS LATHE provides variable spindle speeds from 43 to 3500 rpm. Full motor horsepower through the entire speed range helps assure high torque at low speed for heavy cutting. The unit has centralized pushbutton speed selection and a tachometer for direct reading. Spindle speed is maintained within 0.2 per cent. The drive goes from no load to full load with an average speed drop of only 2 per cent. The spindle is started and stopped by electric brake.

For further information, **write** Nebel Lathe Div., Nebel Machine Tool Corp., 3401 Central Parkway, Cincinnati 25, Ohio

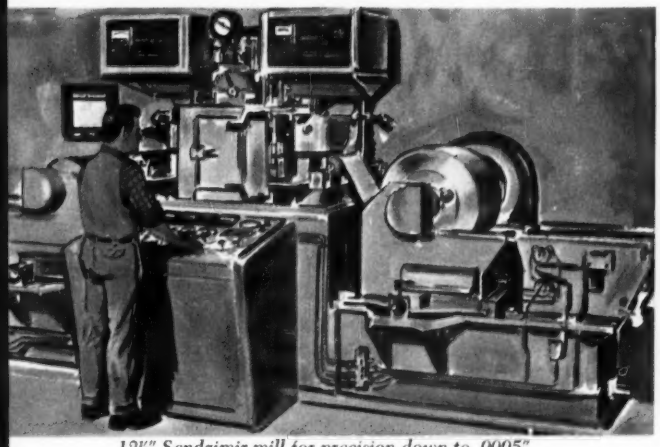
Saw Produces Clean Cuts On High Speed Tool Steels

A NEW saw provides clean cuts on hard, high speed tool steels. There is no measurable metallurgical change in the hardened tools being cut.

The unit uses 14 in. wheels to reduce the number of wheel changes. The wheels operate wet and at starting speeds of less than

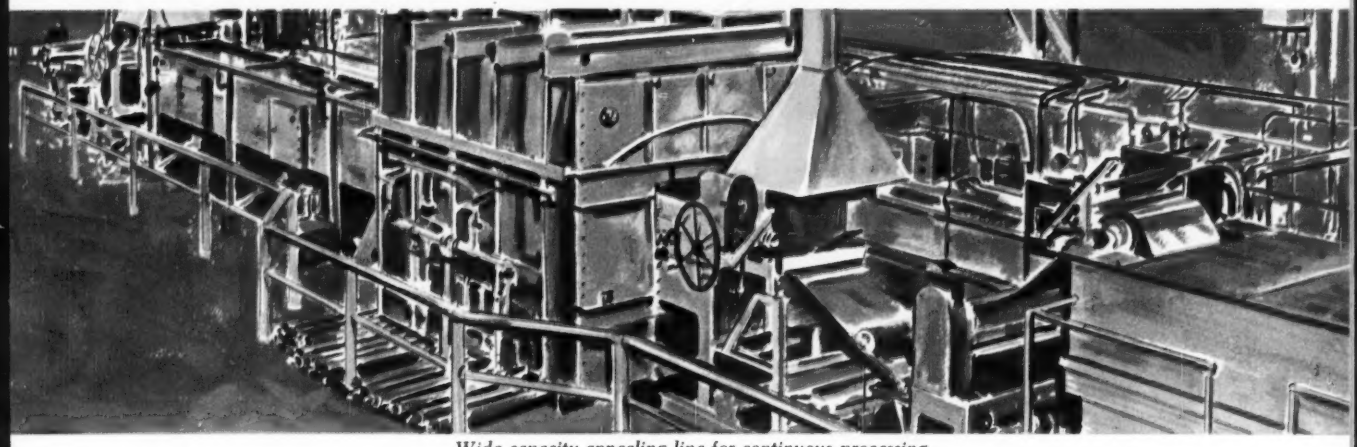


25" Sendzimir mill for capacity on thinner and wider foils



12½" Sendzimir mill for precision down to .0005"

Precision slitting to custom requirements



Wide capacity annealing line for continuous processing

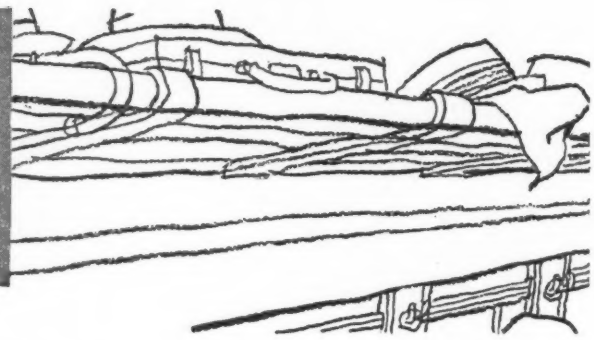
CAPACITY PLUS VERSATILITY EQUALS PERFORMANCE

RODNEY ROLLED IS QUALITY CONTROLLED

Reliable Rodney says:
Make Rodney your source for stainless and alloy strip down to .0005".

RODNEY METALS, INC., (MILL) NEW BEDFORD, MASS.
West Coast Office and Warehouse: 5462 East Jillison St., Los Angeles 22, Cal.

"When you put in the Payroll Savings Plan...



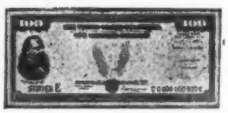
Did your people complain about being solicited?"

"Definitely *not*, Art. Of course we didn't allow our person-to-person talks with employees to approach 'pressure.' We *invited* our staff members to share in the convenience, sound thrift and personal satisfaction of this plan for investing in U.S. Savings Bonds.

"Actually, most of our people took it as a compliment, and I am sure many of them enjoyed the secure feeling of 'belonging' to the organization which this plan gives them."

If your Company has not installed a Payroll Savings Plan as yet, or if you would like to have a greater participation in your organization, contact your State Savings Bonds Director. He is an expert in helping you present this sound, systematic saving plan to your people as a privilege they are entitled to share. They'll be proud to become shareholders in America. You'll be proud, too.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE



STEEL
The Metalworking Weekly

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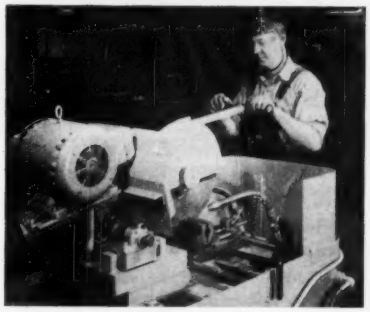


10,000 sfm. The company says 6 to 10 seconds should be allowed for each square inch of tool steel.

There is practically no burr to remove and surfaces as fine as 50 microinches are possible while cutting.

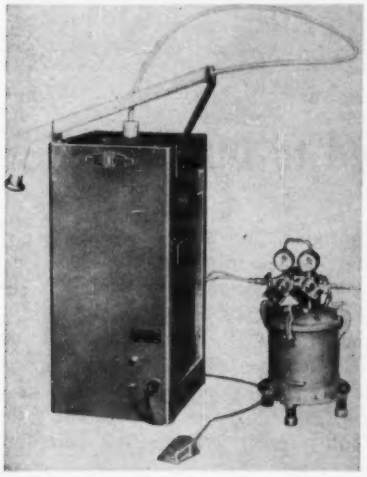
For further information, *write* Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill.

Electrostatic Paint Gun Can Be Used Outdoors

METALLIC and nonmetallic paints can be applied by a portable, high speed, electrostatic hand gun.

Atomization is created by centrifugal force. The unit installs easily into existing systems, makes possible quick color changes, and requires no special operating skill. It can be used outdoors.

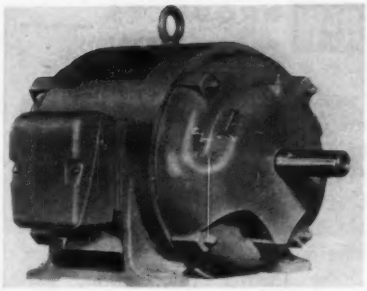
The hand gun weighs 1¾ lb. The power supply weighs 94 lb and operates from a 115 volt, single phase source requiring no heavy duty wiring.



For further information, *write* Sales Engineering Div., Ionic Electrostatic Corp., 111 Monroe St., Garfield, N. J.

Better Ventilation Makes Small Motors Run Cooler

A LINE of open, dripproof, ac motors (1 to 600 hp) with small, compact frames uses enlarged ventilating systems to assure cool operation.



The motors are equipped with preloaded ball bearings fitted at both ends. Bearing housings have

miller
NEW MILLER CONSTANT POTENTIAL D.C. WELDER CP-3-VS
X-ray perfect MIG welds on aluminum, magnesium, stainless and carbon steel sheets down to .030" are the routine result with the New Miller Constant Potential, CP-3-VS. Continuous slope and voltage adjustment even during the course of the weld means that the operator is able to "tune in" the desired settings. There's no burn-through; there's no spatter. Actually, a new performance high in low voltage welding is established with the introduction of this welder with its broad range of from 300 amps at 30v to 25 amps at 10v. • Complete specifications, as well as recommendations for your particular application problems, will be sent promptly upon request.
miller ELECTRIC MANUFACTURING CO., INC., APPLETON, WISCONSIN
Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

extralarge lubricant reservoirs. Aluminum rotors are electronically balanced. You can rotate the terminal boxes to four different positions. The motors will be exhibited in Chicago at the Production Engineering Show.

For further information, *write* Brook Motor Corp., 3302 W. Peterson Ave., Chicago 45, Ill.

Unit Cuts, Deburrs, Bends ¼ to 2½ in. Tubing

CUTTING, deburring, flaring, and bending of hydraulic and pneumatic tubing for installation or repairs can be done right at the job with a unit made by Olsen.

It can handle ¼ to 2½ in. heavy wall tubing (ferrous and nonferrous) including stainless. The abrasive cutoff gives a square cut (within 0.002 in. on 2½ in. tubing) in seconds. Power deburring heads remove burrs prior to flaring. A threading vise can be substituted for the flaring unit.

For further information, *write* Olsen Mfg. Co., 4622 Delemere Blvd., Royal Oak, Mich.

Water, Air Cooled Pump Moves Molten Metals

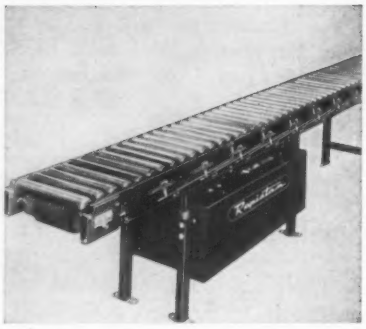
LIQUIDS and molten metal up to 1300° F can be handled by the Gusher Model 150 XE motor driven pump. It can be cooled by circulating water through a ¼ in. fitting or with compressed air when handling molten lead or stereotype metal (up to 800° F).

A similar design is available with multiple V pulleys for independent motor drive.

For further information, *write* Ruthman Machinery Co., 1821 Reading Rd., Cincinnati 2, Ohio.

Conveyor Handles Up to 100 lb per Running Foot

A ROLLER conveyor with adjustable pressure has been developed by Rapids-Standard. The unit



(Model 1250) can handle such things as cans, and other chimed bottom containers, crates or pallets with bottom slats, and materials with flat rigid surfaces.

Eight frame widths (up to 36 in.) are available. Rollers are set high to move packages wider than the roller sections. Maximum loads: 100 lb per running foot.

Units of material can accumulate to any number with minimal line pressure. When the line is released, the units peel off individually rather than as a continuous line.

For further information, *write* Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Worm Gear Speed Reducer Made in 12 Sizes

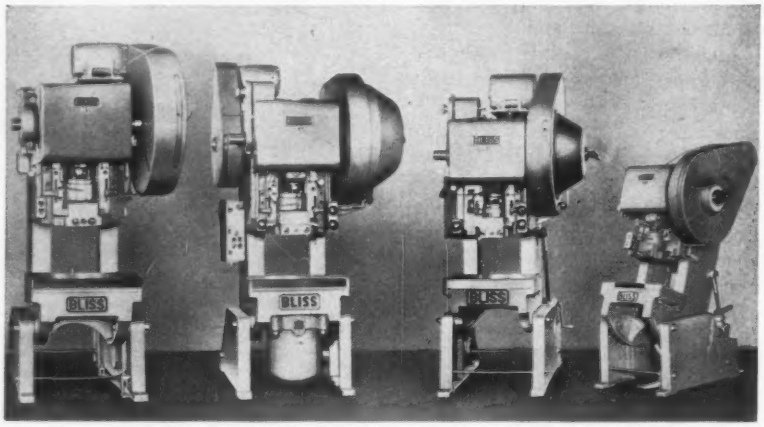
A LINE of fan cooled drives provides right angle power transmission to meet many requirements in the range up to 66 hp. New AGMA standards are followed on ratings.

The drives are made in 12 sizes with center distances from 1⅛ to 8 in. The units (called Radicon) use the involute helicoid form of tooth.

Thermal and mechanical ratings are identical in most cases. You can ignore thermal ratings for infrequent or intermittent service, says the manufacturer.

Air cooling is effective in any mounting position. The reducers are offered in adaptable and fixed base series. All adaptable units are fitted with drywell covers on the output shaft to prevent leakage of oil into the shaft bearings when the shaft is positioned vertically downward.

For further information, *write* Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago, Ill.



Inclinable Presses Rated to 60 Tons

INCLINABLE presses in the Big C Series are available in 22, 35, 45, and 60 ton capacities. With its redesigned cast Meehanite frame, deflection is up to 50 per cent less than previous models. In addition, press and component dimensions have been generally revised upward.

The bed opening, space between uprights, and throat depth are all larger than in previous models. The large crankshafts have diameters 25 to 30 per cent greater at the crankpin.

The larger sizes in the series have a longer slide adjustment and easy locking and a strong connection. The ball type connection screw is similar

to those used on the company's high production presses. All models use laminated bronze V gibs.

An automatic recirculating oil system is available. Both air and oil systems have been located inside the press frame. In many cases, the portable inclining mechanism (worm gear or ratchet type) allows the user to buy a single inclining mechanism for a battery of presses.

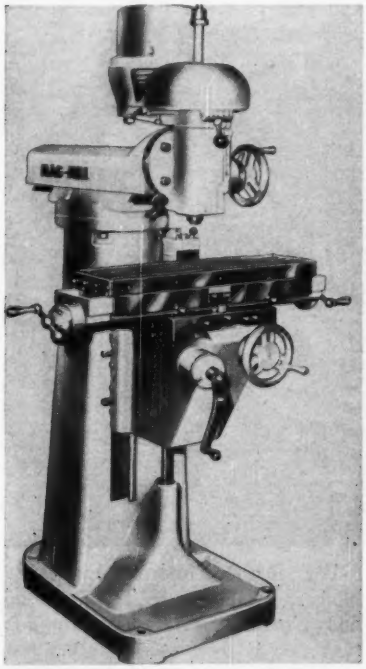
Press controls fit into a box 14 in. wide and 18 in. high. In addition to run, stop, and jog, the combination controls have settings for continuous or single stroke operation. An air friction or mechanical clutch is available.

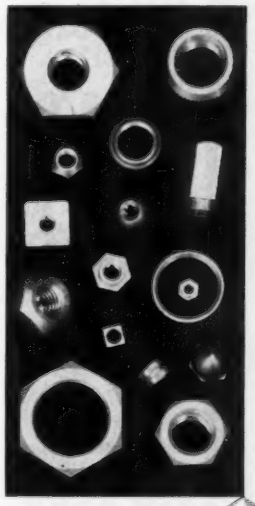
For further information, *write* E. W. Bliss Co., 1382 Raff Rd. S.W., Canton, Ohio.

Milling Machine Has Built-in Magnetic Table

BOLTING and clamping of parts are eliminated on the Mag-Mill vertical milling machine. Secret: A built-in electromagnetic table equipped with a dc rectifier. A built-in manual reversing switch demagnetizes the table, the part, and accumulated chips. Automatic demagnetizing is also available.

The table has a 7 x 27 in. working surface with three T slots 11/16 in. wide and 2⅛ in. apart. Longi-





AS SPECIALISTS IN PRECISION NUTS ... both brass and aluminum ... we can help resolve your fastening or assembly problems by supplying *uniformly accurate turned nuts to your exact specifications.* To date, we have furnished more than 3,457 different types of special or odd size nuts, including miniatures, to customers making widely diversified products. Their satisfaction with our over-all performance is eloquently confirmed by repeat orders ... plus orders for new items!

As the leading producer of turned nuts, we specialize in reliable "on schedule" deliveries and competitive pricing in addition to premium quality. That is why you get better service ... faster ... from Fischer.

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FISCHER SPECIAL MFG. CO.

476 MORGAN STREET CINCINNATI 6, OHIO

9815-FS

tudinal table travel is 16 in., cross travel 8 in., vertical knee travel 15 in., vertical quill travel 4 in.

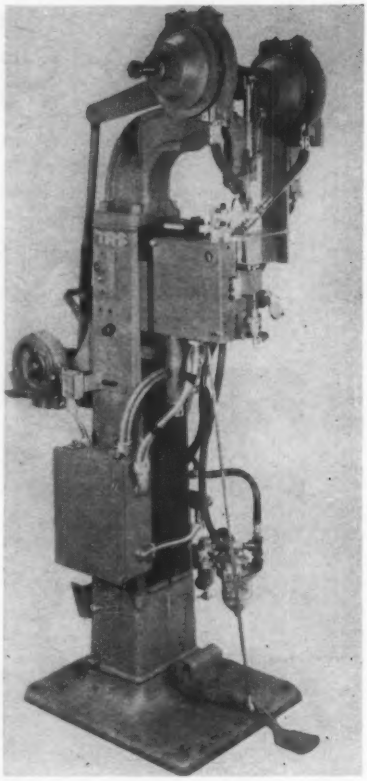
Distance from spindle nose to top of table is 16 5/16 in. With the optional compound head swivel, the distance is 16 9/16 in.

For further information, *write* Dept. S7, Hanchett Magna-Lock Corp., Big Rapids, Mich.

Machine Feeds and Sets Male and Female Rivets

AUTOMATIC, instantaneous feeding and setting of male and female cutlery or compression rivets can be done on the TRS Model 111 riveting machine. It is equipped with two sets of feeding parts.

The male rivet is fed head up. The female rivet is fed in an inverted position into the lower jaws. It is held head down. Equipment includes a combination manual and air operated, hold-down clamp, an automatic air jet to keep the lower jaws free of foreign matter, and an auxiliary hand valve to feed a female rivet individually.



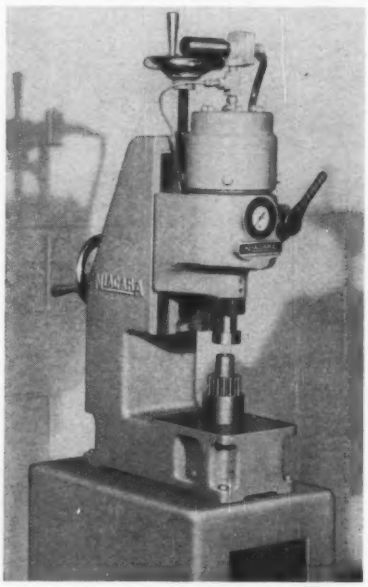
For further information, *write* Tubular Rivet & Stud Co., Quincy 70, Mass.

Air Presses Come in ½ to 2 Ton Sizes

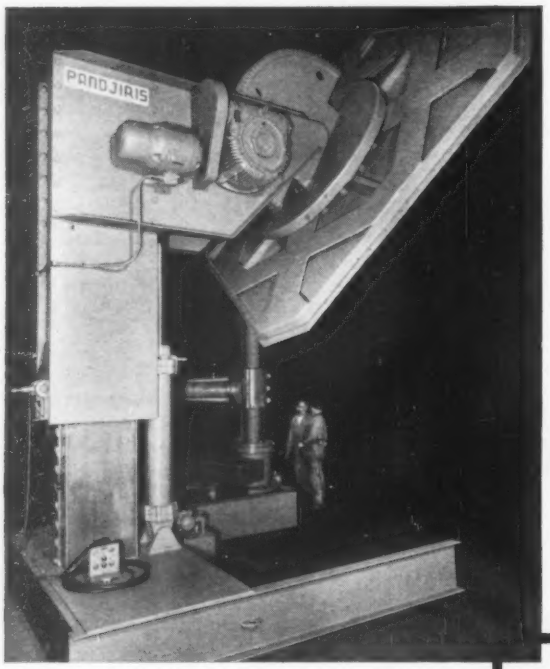
A LINE of single acting air presses comes in 28 models with four press sizes ranging ½ to 2 tons at 85 psi. You can choose between three air and three electrical control systems.

The units can do punching, swaging, staking, upsetting, and imprinting operations plus the seating and removal of close tolerance bearings and bushings.

For specialized applications, electronic timers, speed control valves, and pressure limit controls are available. Stroke lengths and shut heights are infinitely adjustable within the range of each press size. Cast frames help assure minimum deflection under severe loads. The diaphragm type, frictionless air cylinder requires no lubrication. The standard round ram adapter can be quickly replaced with a special unit to accommodate a wide assortment of punches and dies. Either bench or floor mounting can be used.



For further information, *write* Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.



Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

Put 20 tons where you want it

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

NEW Literature

Write directly to the company for a copy

Industrial Lubricants

"Performance of SCL Industrial Lubricants" is a 12 page report that presents detailed information on the factors in selecting and using lubricants for industrial machinery. Included is a comprehensive case study of four steel plants. Ask for Lube Report No. 102. Elco Lubricant Corp., Jennings Road & Denison Avenue, Cleveland 9, Ohio.

Chains and Sprockets

Selecting a chain from horsepower tables and specification of sprocket wheels are included in a new Jeffrey chains and sprockets catalog, No. 999, 168 pages. The discussion includes 14 of the most popular types of chains used in industry. Hub classes, sprockets, attachments, and drive chain data are also covered. Jeffrey Mfg. Co., 956 N. Fourth St., Columbus 16, Ohio.

Tubing Selection Guide

Selection of steel tubing according to type, finish, analysis, formability, machinability, weldability, and relative cost is made easier by comparative listing of characteristics of seamless and welded round, square, and rectangular tubing for mechanical, hydraulic cylinder, fluid line, and structural applications. Ask for Technical Bulletin 12-10. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

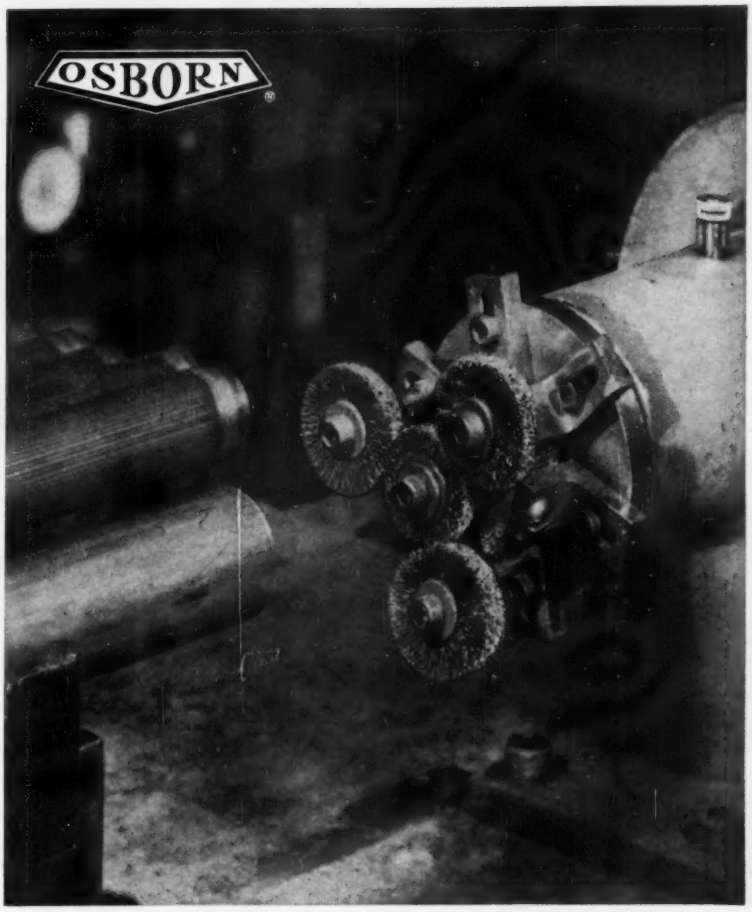
Screw Thread Guide

"Harper Thread Guide" outlines the history of threads, defines the terminology used in the industry, and explains with diagrams the differences between the major kinds of screw threads. Charts detail the measurements, characteristics, and capabilities of the standard thread types according to the Unified and American Thread Series, ASA B 1.1-1960. H. M. Harper Co., 8200 Lehigh Ave., Morton Grove, Ill.

NEW BOOKS

Welding Nuclear Power Piping, American Welding Society, Dept. T, 33 W. 39th St., New York 18, N. Y., 20 pages, $1.50
Welding of ferrous materials for nuclear power piping operations is discussed in this report. The material includes welding procedures, detailed operation sketches, joint design, angles and dimensions, quality control, qualification of procedures, welder qualifications, and inspection methods.

Filler Metal Comparison Charts, American Welding Society, Dept. T, 33 W. 39th St., New York 18, N. Y., 48 pages, $2.50
The brand names of 78 companies are listed in the welding rod and electrode comparison charts. Fifteen AWS-ASTM specifications are involved. Brands and manufacturers' names are in two indexes.



IN THIS SPECIAL POWER BRUSHING SETUP, five Osborn Ringlock® brushes are fixed (do not revolve individually) on a power-driven backing plate. As tubing is guided into the brush cluster, the backing plate rotates the brushes around the tubing end. Inside and outside diameters are wiped clean and cut-off burr is removed.

Tubing gets a quick clean-up

with OSBORN Power Brushing

This important manufacturer of heat transfer equipment had to find a way to clean the ends of long, hard-to-handle tubing after cuttting to length. Both the inside and outside of the tubes required finishing. And the cut-off burrs needed to be removed, too.

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Small Upturn Seen for August

LOOK FOR a modest improvement in steel orders, output, and shipments this month. As vacations end and users complete their inventory adjustments, demand will gradually accelerate.

You can expect steelmaking operations in August to average about 57 per cent of capacity (vs. 51 per cent last month). Ingot production will be about 7.2 million tons (vs. July's 6.4 million).

In the Midwest, bookings for August are about 5 per cent ahead of last month's. Two weeks ago, sales executives were hoping that the pickup would be twice that size. But there's an encouraging report from one big mill: Orders received after July 1 were 35 per cent larger than those on the books at the start of the month. Last minute buying indicates a further shrinkage of consumer inventories.

RECOVERY POSTPONED—A month ago, market analysts were more optimistic about August. But they were jarred when automakers started "operation rollback"—deferment of a large part of their shipments until September. Since the upturn for steel will get most of its impetus from automotive requirements, September is being touted as the industry's recovery month. How much of an upturn can we expect in September? Industry experts are guessing that operations will average about 65 per cent of capacity. If they do—and if the estimate for August is correct—the third quarter rate will be 58 per cent (vs. 72.7 in the second quarter and 93.8 in the first).

YEAR'S OUTPUT REVISED—Last week, steelmakers operated their furnaces at 53.8 per cent of capacity (0.6 percentage point below the previous week's revised rate) and produced about 1,533,000 ingot tons. Output in the first seven months was 67.1 million tons. To produce 130 million ingot tons in 1960—the record output that many observers predicted last December—the industry would have to operate at 102 per cent of capacity for the rest of the year. Since that's out of the question, estimates are being scaled down. Assuming an average rate of 57 per cent this month, 65 per cent in September, and 75 per cent in each fourth quarter month, the year's output will be 110 million ingot tons. If fourth quarter operations average only 70 per cent of capacity, the year's ingot production will be 108 million tons. Since 1950, production has averaged 102 million tons a year.

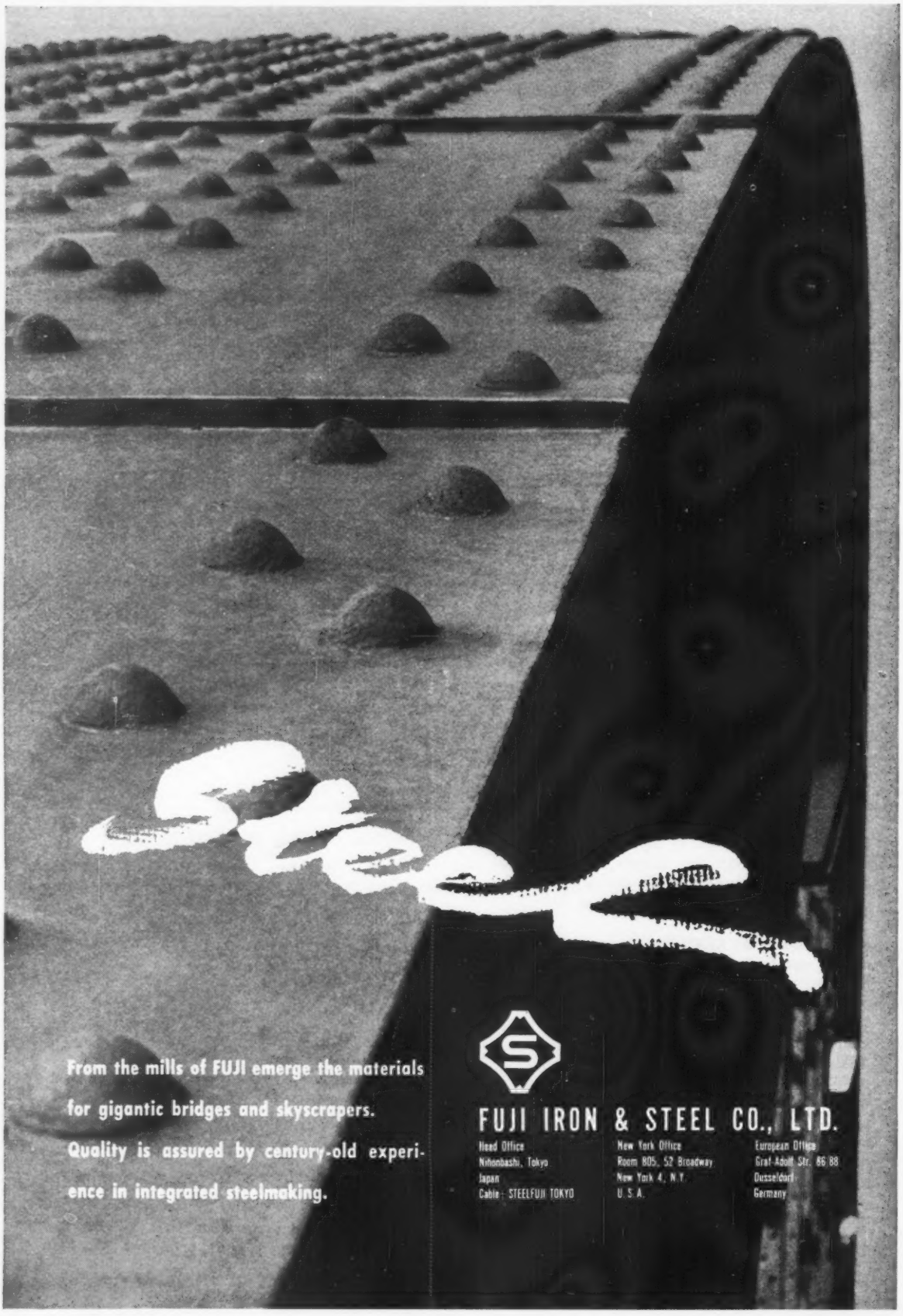
PLATES ON UPTREND—July was the low month for plates, producers believe. Orders have bottomed out and are on the upswing. Pipeline construction is largely responsible for the market's firmer tone. Tonnages required to date haven't been exciting, but sales officials look for business to pick up when ground is broken for some of the big projects now on the boards.

STRUCTURALS SLOW—Unless there's a spurt of last minute orders, August won't be as good a month for structurals as July. Last month, wide flange beam producers maintained fairly high operations by working off their backlogs. Now the backlogs are depleted and new orders are scarce. Since service centers and fabricators have big inventories and aren't consuming them rapidly, there's little hope for an upturn until September or October. Almost all of the steel that is being sold now is for specific jobs. Road building and bridgework are the mainstays of the market. Many plant expansion programs have apparently been shelved. It's hoped that fabricators will accumulate some jobs during their vacation shutdowns.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	111	114
Reinforcing	...	115
Boiler Tubes	...	119
Canada	...	*
Charts:		
Finished Steel	...	113
Ingot Rate	112	...
Scrap Prices	...	125
Clad Steel	...	120
Coal Chemicals	...	122
Coke	...	122
Comparisons	...	113
Contracts Placed	111	...
Contracts Pend.	111	...
Electrodes	...	122
Fasteners	...	119
Ferroalloys	131	123
Fluorspar	...	122
Footnotes	...	119
Imported Steel	...	122
Ingot Rates	112	...
Metal Powder	...	122
Nonferrous Met.	128	130
Ores	125	122
Pig Iron	125	121
Piling	...	114
Plates	110	114
Plating Material	...	131
Prestressed Strand	...	119
Price Indexes	...	113
Producers' Key	115	...
R.R. Materials	...	119
Refractories	...	122
Scrap	124	126
Semifinished	...	114
Service Centers	111	121
Sheets	110	115
Silicon Steel	...	116
Stainless Steel	...	120
Steel Shipments	112	...
Strip	110	116
Structurals	111	114
Tin Mill Prod.	110	116
Tool Steel	...	120
Tubular Goods	131	120
Wire	131	116

*Current prices were published in the July 25 issue and will appear in subsequent issues.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STEEL
QUARTERLY SURVEY

MILL PRODUCTS	CURRENT INVENTORIES					4th Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
HOT-ROLLED CARBON BARS	4%	25%	43%	23%	5%	27%	67%	6%
COLD-FINISHED BARS	1%	25%	42%	19%	13%	28%	66%	6%
H & C-R SHEETS, STRIP	5%	11%	44%	21%	19%	32%	58%	10%
LIGHT PLATES	5%	15%	34%	33%	13%	32%	60%	8%
HEAVY PLATES	6%	11%	32%	40%	11%	37%	54%	9%
STRUCTURAL SHAPES	7%	13%	30%	37%	13%	42%	55%	3%
COPPER & BRASS	12%	12%	55%	18%	3%	10%	77%	13%
ALUMINUM	6%	12%	55%	21%	6%	15%	78%	7%

FIGURES are percentages of respondents to STEEL's quarterly survey. UNDERSCORED figures show how most respondents reported.

Metal Stocks Dip Toward Working Levels

Inventories are down and some further reductions are planned. But STEEL's quarterly survey shows the situation is stabilizing. A buying upturn may be near

GENERAL INVENTORY paring by metal buyers has gone about as far as it will go. Inventories have been dropping for the last two quarters. A stabilizing trend, which suggests an upturn in purchases may be near, is appearing. Right now, most purchasing agents plan to stand pat. An eastern buyer of hot rolled carbon bars, cold finished bars, plates, and structural shapes sums up the situation: "We've reduced our inventory to the absolute minimum. Quick delivery from the mills and a reduced volume of business have indicated the need for less inventory."

More than 66 per cent of the respondents to STEEL's quarterly survey of metal buyers expect stocks to be at present levels at the first of the year. About 57 per cent planned to stand fast in the third quarter. Nearly 27 per cent predict lower inventories by the end of the fourth quarter, but that's 7 percentage points below those planning cutbacks in the last survey. Only 7 per cent see an upturn.

• **Overstocks Down**—Although 31 per cent of the purchasing agents polled are still plagued with overstocks, that's a drop from the 40 per cent having such difficulties at this time last quarter and seems to confirm the firming situation. Cold rolled sheet and strip and hot rolled alloy bars are in the greatest abundance. Hot rolled carbon bars, hot rolled sheets and strip, and light plates also had several mentions. Only 4 per cent of the respondents report delivery problems.

The general inventory breakdown: Under 10 days, 6 per cent; 10 to 30 days, 18 per cent; 30 to 60 days, 42 per cent; 60 to 90 days, 24 per cent; over 90 days, 10 per cent.

• **Construction Up**—With construction in full swing, there has been quite a shift in structural and heavy plate reserves. Buildups: Heavy plates in the 10 to 30 and 60 to 90

day categories; structural shapes in the under 10 days and 60 to 90 day groupings. Construction got off to a slow start because of bad weather this spring.

Other ferrous products gained in the 10 to 60 day periods and declined in the 60 day and over groupings. Exception: Light plate reserves increased only in the 10 to 30 day category.

● **Nonferrous**—Users will probably slow down their rate of reduction of copper and brass stocks even though the current supply of copper is plentiful. Reasons: Two major sources of supply are threatened by unrest in the Congo and the possibility of a strike at Anaconda's Chuquicamata mine in Chile. The labor contract there expires in September.

Here again, it's indicated that an upturn in buying may be around the corner. STEEL's respondents seem to back up the optimistic note: 13 per cent see an inventory increase by Jan. 1 while 10 per cent plan further reductions.

The situation in aluminum is not quite so hopeful. Although inventories are below last quarter, further decreases are planned by 15 per cent of the purchasing agents while only 7 per cent expect a bolstering of reserves.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 115 & 116

Galvanized material is moving better than other grades of sheets. One leading producer is booked up solidly through August and into early September.

Hot rolled sheets can be had for shipment in two weeks, while cold rolled sheets are available in three weeks or a shade beyond. The heavy tonnage items particularly reflect the lag in automotive and household appliance requirements.

Most consumers continue hand-to-mouth buying. They still have considerable steel on hand and are engaged in inventory liquidation, which should be pretty well completed by the end of the summer.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., is marketing a new aluminum product for use by the culvert manufacturing industry. Called Kaiser Aluminum culvert sheet, it is priced competitively with galvanized steel, which is conventionally used for culverts, company officials say.

Republic Steel Corp. has revised the classification of extras on galvanized, galvannealed, and culvert sheets. Changes were made "to meet established competition," officials say. The price of hot dipped, zinc coated sheets has varied in relation to the price of prime western zinc. To avoid the fluctuation, Republic has changed the size extras on the specified products to reflect the present price of zinc (13.00 cents a pound). The move follows the pattern set by U. S. Steel Corp. on June 13. It is reported that no changes on these coated products are anticipated in the foreseeable future, regardless of the fluctuations in the zinc market.

Ulbrich Stainless Steels Revises Price Schedule

Ulbrich Stainless Steels Inc., Wallingford, Conn., has issued a revised price schedule. It results in an over-all price decrease to most users of standard items of specialty strip which the firm produces.

The schedule introduces some concepts to the field of price practices which the firm believes may set a pattern for the specialty strip industry. One important change is the classification of items into standard and nonstandard categories.

The quantity schedules reflect the standard and nonstandard division, but carry a sound basis for pricing the smallest possible order. The minimum charges are basically for service and labor and are separate. Quantity extras on Ulbrich stainless strip, 0.0015 in. and thicker are:

	Price per 100 pounds	
Pounds	Stock Items	Nonstock Items
5000 & over..	$2.75	$2.75
4999 to 2000..	4.00	4.00
1999 to 1000..	6.75	6.75
999 to 500...	9.75	9.75
499 to 300...	12.75	15.00
299 to 100...	27.00	35.00
99 to 50....	55.00	60.00
49 to 25....	75.00	75.00 plus $7.50 net*
24 to 10....	100.00 plus $5 net*	100.00 plus $20 net*
	——Per pound——	
9 to 0.....	1.50 plus $10 net*	1.50 plus $25 net*

*To net charge add: $5 for cut lengths; $5 for tempered material; $10 for cut lengths and tempered material; and $5 for material less than 0.005 in. thick.

Plates . . .

Plate Prices, Page 114

Slower buying for heavy equipment, notably construction machinery, contributes to dull demand for plates. Shops generally are not placing fourth quarter tonnage, although inventories are low and below normal in some instances. Business is expected to continue slow for at least another month.

Mill deliveries (within ten days to three weeks on sheared plates) do not encourage forward coverage. For fill-in sizes and grades, warehouse stocks are ample for present needs.

Armco Steel Corp.'s Sheffield Div. at Houston is increasing its facilities to continuously heat treat plates up to 160 in. wide. It has ordered a continuous wide plate line from Drever Co., Bethayres, Pa. The division has been handling bars and plates up to 72 in. wide on a heat treating line installed in 1958.

The newly projected line, expected to be in full operation next year, will be fully automatic. Features include: Pushbutton supervision from an air conditioned control room, closed circuit television monitoring, and phone intercommunication.

While designed to accommodate 160 in. plate, the line at the start-up will handle plates from Sheffield's 130 in. mill.

Tin Plate . . .

Tin Plate Prices, Page 116

Tin plate can shipments increased to 407,020 tons in May from 362,850 tons in April, says the Bureau of Census. The total for the first five months (1,688,769 tons) was down from the corresponding period of last year (1,746,404 tons).

Shipments of aluminum cans came to 1713 tons in May and 1550 tons in April, bringing the total for the first five months up to 8180 tons.

Movement of tin plate cans for fruit and fruit juices totaled 58,271 tons in May and 45,122 tons in April. Those for vegetables and vegetable juices amounted to 46,890 tons in May and 43,055 tons in April. The two categories totaled 105,161 tons in May vs. 104,751 tons in the corresponding month in 1959. Fruit cans totaled 237,310

tons, vegetable cans 172,818 tons in the first five months.

Shipment of beer cans, another large category, totaled 88,094 tons in May compared with 72,888 tons in April. Total shipments in the first five months were 314,940 tons against 326,918 tons in the corresponding period of last year.

Steel Bars . . .

Bar Prices, Page 114

While bar demand is diversified, the market remains slow in all lines. Hot rolled carbon bars are available in about three weeks; cold drawn bars, promptly from stock to four weeks, depending upon specifications. Most cold drawers have ample stock on hand ready for drawing and in some instances have drawn material in stock for prompt shipment.

Bar sellers generally are awaiting a spurt in automotive demand, not only for what it will mean directly in the way of auto requirements but indirectly in other lines.

Demand for steel bars for defense contracts is building up in New England. Most tonnage is for small arms. Saco-Lowell Shops has a contract for machine guns to be built at Biddeford, Maine.

Distributors . . .

Prices, Page 121

Steel service centers anticipate a little pickup in bookings during August, but substantial improvement is not expected until after the vacation season is over. Distributors hold large stocks, and some are willing to shade prices to spur sales.

Shipments of Structurals Jump to 12-Month High

Structural steel shipments jumped sharply in June to the highest total in the last 12 months, says the American Institute of Steel Construction. But bookings eased off.

June deliveries totaled 332,694 tons, an increase of 48,000 tons over the May total, but a decline of 32,306 tons (9 per cent) from the June, 1959, total. A year ago, shipments were stepped up prior to the steel strike.

Total shipments for the first half were 1,631,000 tons, slightly less than the 1,651,000 shipped in the same period last year.

June bookings totaled 267,910 tons, down slightly from the May total and 8 per cent under the total for the like month a year ago. Bookings for the first six months were 1,735,701 tons, 8 per cent greater than in the same period in 1959.

Backlogs as of June 30 were 2,219,014 tons. Of that amount, 1,275,926 tons (58 per cent) are scheduled for fabrication during the four months ending Oct. 31.

Structural Shapes . . .

Structural Shape Prices, Page 114

Structural inquiry has begun to level off again. But there is considerable work up for early bidding, especially public work. In general, fabricators are in a little better position than they were a few weeks ago. Some of the large shops are booked up four to five months; medium size shops, on the average, around three months; and the small shops, two months.

Practically all fabricators are competing keenly for additional tonnage. Most of the tonnage in New England is for bridges, stringer spans, and composite wide flange beams.

Forward buying of plain material is slow. With mill shipments prompt, shops are buying only to cover contracts as booked. Standard and wide flange sections are available within two to three weeks.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3315 tons, composite beam and welded plate girder bridge, Ouachita River, Ouachita parish, Louisiana, to Nashville Bridge Co., Nashville, Tenn.; Peter Kiewit Sons Co., Omaha, Nebr., general contractor.

750 tons, welded composite beam spans (steel section), Lake Ponchartrain bridge, Tammany-Orleans parishes, Louisiana, to Nashville Bridge Co., Nashville, Tenn.; Brown & Root Inc., Houston, general contractor.

245 tons, angles, U. S. engineer, San Francisco, to Oregon Steel Mills Div., Gilmore Steel Corp., Portland, Oreg.

223 tons, library, University of Vermont, Burlington, to Vermont Structural Steel Co., Burlington; H. P. Cummings Construction Co., Woodsville, N. H., general contractor.

STRUCTURAL STEEL PENDING

700 tons, second Lake Washington floating bridge, Seattle; project financed and general contract to Guy F. Atkinson Co., South San Francisco, Calif.

580 tons, including joists, lower Providence-Worcester junior and senior high school, Montgomery County, Pennsylvania; Van Campion & Co., Philadelphia, low on general contract.

300 tons or more, 22 story, Hilton Hotel, Portland, Oreg.; bids in.

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TWX Wallingford, Conn. 277

200 tons, spillway gate hoists, McNary Dam; Northwest Marine Iron Works, Portland, Oreg., low $127,173 to U. S. Engineer, Walla Walla, Wash.

150 tons plus, standby powerhouse, Hanford Works, Hanford, Wash.; bids Aug. 4.

REINFORCING BARS . . .

REINFORCING BARS PLACED

9200 tons, Lake Ponchartrain bridge, Tammany-Orleans parishes, Louisiana, to Sheffield Steel Div., Armco Steel Corp., Houston; Brown & Root Inc., Houston, general contractor.

1200 tons, addition to Rayonier pulp plant, Hoquiam, Wash., to Pacific Coast Div., Bethlehem Steel Co., Seattle; W. G. Clark Construction Co., Seattle, general contractor.

985 tons, pier substructure, Washington state Vantage Bridge, Columbia River, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Manson Construction & Engineering Co., Seattle, general constractor.

878 tons, composite beam and welded plate girder bridge, Ouachita River, Ouachita parish, Louisiana, to Southern Steel Products Inc., New Orleans; Peter Kiewit Sons Co., Omaha, Nebr., general contractor.

450 tons, post office, Parkersburg, W. Va., to Connors Steel Div., H. K. Porter Company Inc., Birmingham; Blount Bros. Construction Co., Montgomery, Ala., general contractor.

370 tons, library, University of Vermont, Burlington, to Truscon Steel Div., Republic Steel Corp., Boston; H. P. Cummings Construction Co., Woodsville, N. H., general contractor.

250 tons, Rhodes of Seattle garage, Tacoma, Wash., to J. D. English Steel Co., Tacoma; Early Construction Co., Tacoma, general contractor.

100 tons, Cascade School, Everett, Wash., to Northwest Steel Rolling Mills Inc., Seattle; Newland Construction Co., Everett, general contractor.

REINFORCING BARS PENDING

5300 tons, second Lake Washington floating bridge, Seattle; project financed and general contract to Guy F. Atkinson Co., South San Francisco, Calif.

250 tons, two Idaho, 804 ft Snake River highway spans; Teller Construction Co., Idaho Falls, Idaho, low $451,267.

210 tons, also siphon pipe, etc., Idaho state road project. Canal and Bonneville counties; bids to Boise, Aug. 9.

170 tons, two concrete reservoirs; bids to Wenatchee, Wash., Aug. 1.

PLATES . . .

PLATES PLACED

500 tons, estimated, penstocks, Clear Creek and Trinity powerplants, Central Valley project, Bureau of Reclamation, Denver, to U. S. Steel Corp., Pittsburgh.

300 tons, standpipe, New Haven Water Co., West Haven, Conn., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

100 tons or more, elevated water tank, King County District No. 105, Seattle; Chicago Bridge & Iron Co., Seattle, low $130,022.

100 tons, municipal storage tank, Philomath, Oreg.; American Pipe & Construction Co., low, $28,390.

100 tons or more, two combinations (steel tow boat and barge); Sept. 6; delivery U. S. Coast Guard Depot, St. Petersburg, Fla.

PIPE . . .

CAST IRON PIPE PLACED

1433 tons, 4, 6, 8, and 12 in. cast iron pipe; Pinehurst District expansion, Seattle, to U. S. Pipe & Foundry Co., Seattle; Argentieri Construction Co., Seattle, general contractor.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Irish Transport Co., fifteen, 875 hp diesel-electric locomotives, to General Motors Overseas Corp., Detroit; delivery will begin in December.

RAILROAD CARS PLACED

Atlantic Coast Line, 50, ninety ton covered hoppers, to Pullman-Standard Div., Pullman Inc., Chicago. Cars will be built in Butler, Pa., plant.

RAILROAD CARS PENDING

New York City Transit Authority, 380 passenger cars, contemplated; also, mechanical upgrading of 200 cars.

Argentina, railroad rehabilitation program proposed, including 150 electric cars, 300 coaches, 100 switch engines, 10 line locomotives, 10 wrecking trains, and 22 cranes.

Shipments of Steel Products—May, 1960

(Net tons)

Products	Carbon	Alloy	Stainless	First Five Months 1960	First Five Months 1959
Ingots, etc.	13,992	10,371	2,301	186,333	136,511
Blooms, slabs, etc.	92,442	31,875	1,629	793,429	785,982
Tube rounds	1,173	184	.....	10,158	7,589
Skelp	9,820	.....	.....	76,765	29,964
Wire rods	53,233	1,695	752	499,855	585,175
Structurals (heavy)	424,798	5,460	8	2,546,060	2,293,793
Steel piling	26,473	.....	.....	188,381	192,454
Plates	472,087	54,421	2,957	3,394,047	3,130,292
Rails (standard)	93,131	.....	.....	438,588	400,702
Rails (all other)	2,699	.....	.....	23,460	21,984
Joint bars	3,643	.....	.....	16,148	19,246
Tie plates	12,442	.....	.....	71,578	96,584
Track spikes	6,344	.....	.....	25,676	28,540
Wheels	24,430	39	.....	124,263	110,997
Axles	10,460	4	.....	62,032	51,935
Bars (hot rolled)	435,378	101,413	3,734	3,826,399	3,839,885
Bars (reinforcing)	192,299	.....	.....	827,075	1,048,315
Bars (cold finished)	97,255	18,908	4,222	777,686	767,406
Tool steel	899	6,711	.....	45,917	42,809
Standard pipe	150,889	182	.....	1,072,876	1,194,138
Oil country goods	58,894	14,945	.....	672,753	1,203,865
Line pipe	271,088	8	.....	1,271,425	1,632,463
Mechanical tubing	48,683	17,031	468	420,964	413,874
Pressure tubing	18,876	3,156	1,407	122,366	133,270
Wire—drawn	186,964	3,207	1,540	1,180,642	1,386,875
Nails & staples	26,368	.....	.....	153,941	200,534
Barbed wire	4,930	.....	.....	23,325	30,207
Woven fence	12,481	.....	.....	58,386	89,878
Bale ties, etc.	10,537	.....	.....	28,366	33,950
Black plate	56,606	.....	.....	282,653	331,450
Tin plate—hot dipped	37,705	.....	.....	174,536	220,628
Tin plate—electrolytic	473,083	.....	.....	2,416,774	2,836,305
Sheets—hot rolled	695,011	24,001	2,796	4,366,105	4,332,398
Sheets—cold rolled	1,340,617	5,158	11,201	7,381,995	7,240,839
Sheets—galvanized	288,162	.....	.....	1,525,706	1,526,350
Sheets—other coated	21,544	.....	.....	130,030	137,239
Elec. sheets & strip	2,971	42,384	.....	299,478	324,415
Strip—hot rolled	106,651	1,618	279	713,467	705,676
Strip—cold rolled	95,827	1,412	14,071	711,916	654,623
Total (1960)	5,880,884	344,183	47,365	36,941,554	.....
Total (1959)	8,099,208	580,273	74,638	.....	38,219,140

Data from American Iron & Steel Institute.

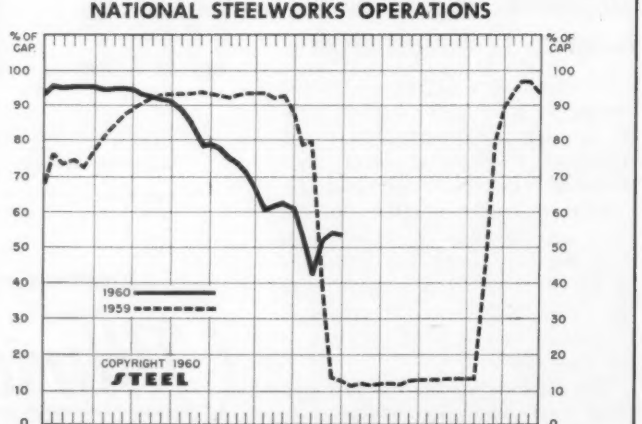
DISTRICT INGOT RATES

(Percentage of capacity utilized)

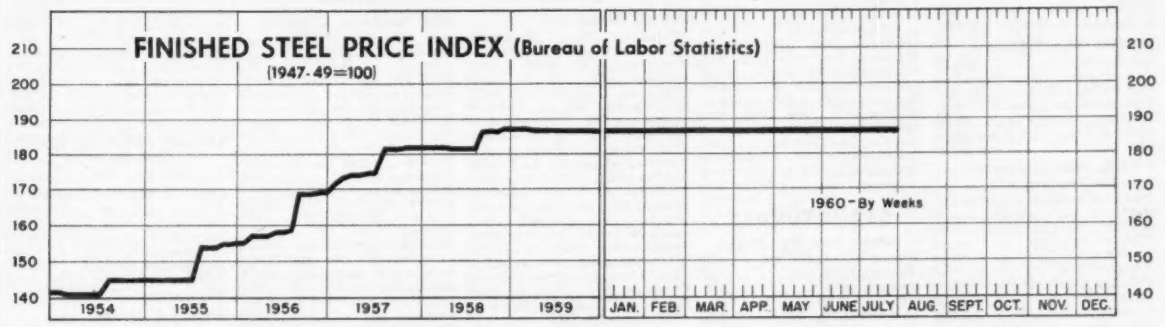
	Week Ended July 31	Week Ago	Month Ago	Year Ago
Northeastern	61	60	58	*
Buffalo	55	56	60	*
Pittsburgh	51	48	46	*
Youngstown	46	45	40	*
Cleveland	28	48	57	*
Detroit	80	86	82	*
Chicago	59	57	52	*
Cincinnati	48	47	47	*
St. Louis	44	50	60	*
Southern	60	64	56	*
Western	53	53	62	*
Total Industry	53.8	54.4	53.0	12.2
Index (1947-49=100)	95.4	96.5	94.0	21.5
Net Tons (In thousands)	1,533	1,550	1,510	345

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



July 26, 1960	Week Ago	Month Ago	June Index	Year Ago
186.2	186.2	186.6	186.6	187.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.493
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.433
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	195.398
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed(80-rod spool)	8.414
Woven Wire Fence (20-rod roll)	20.003

STEEL's FINISHED PRICE INDEX*

	July 27 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	207.63
Index in cents per lb	6.713	6.713	6.713	6.713	5.625

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$126.64
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	31.83	31.67	31.33	38.67	42.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	July 27 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.50
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.317
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35-6.45
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-5/8" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton

	July 27 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	56.16
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	59.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.),deld.,Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$30.50	$30.50	$30.50	$39.50	$42.00
No. 1 Heavy Melt, E. Pa.	34.00	34.00	34.00	40.00	43.00
No. 1 Heavy Melt, Chicago	31.00	30.50	29.50	36.50	41.00
No. 1 Heavy Melt, Valley	33.50	33.50	32.50	41.50	41.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	31.50	38.50	39.50
No. 1 Heavy Melt, Buffalo	29.50	29.50	30.50	33.50	34.50
Rails, Rerolling, Chicago	51.50	49.50	49.50	59.50	59.00
No. 1 Cast, Chicago	40.50	40.50	40.50	52.50	45.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	26.25

Steel Prices

Mill prices as reported to STEEL, July 27, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 115; footnotes, page 119.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)

Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)

Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 ..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 ..119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP

Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W. Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 ....5.55
Clairton Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 ....8.05
Bessemer Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers O. Y1 ....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ....5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ....6.50
Munhall,Pa. U5 ....6.50
S Chicago Ill. I-2, U5 ....6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5 W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary Ind. U5 ....7.50
Houston S5 ....7.60
Ind Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES

Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron

Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.75
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.425
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.825
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.75
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025

Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex. (26) T4 5.25
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ...5.575
Franklin,Pa. (4) F5 ..5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill. (8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts .Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Sevmour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 ....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 .8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M22.7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Cleveland A7 .....15.55
Carnegie,Pa. S18 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ..15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.10	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.10	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	....	....	18.85	22.95	27.80
Buffalo W12	....	....	18.85	....	....
Fostoria,O. S1	....	....	19.05	22.15	....
FranklinPark,Ill. T6	....	....	19.20	23.30	28.15
Harrison,N.J. C18	....	....	18.85	22.95	27.80
NewYork W3	....	....	18.85	22.95	27.80
Palmer,Mass. W12	....	....	18.85	....	....
Trenton,N.J. R5	....	....	18.85	22.95	27.80
Worcester,Mass. A7, T6	....	....	18.85	22.95	27.80
Youngstown S41	....	....	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M22 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ..7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrel,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harbor Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 .8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....13.40
KansasCity,Mo. U3 ...12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling, N. J. R5 ....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

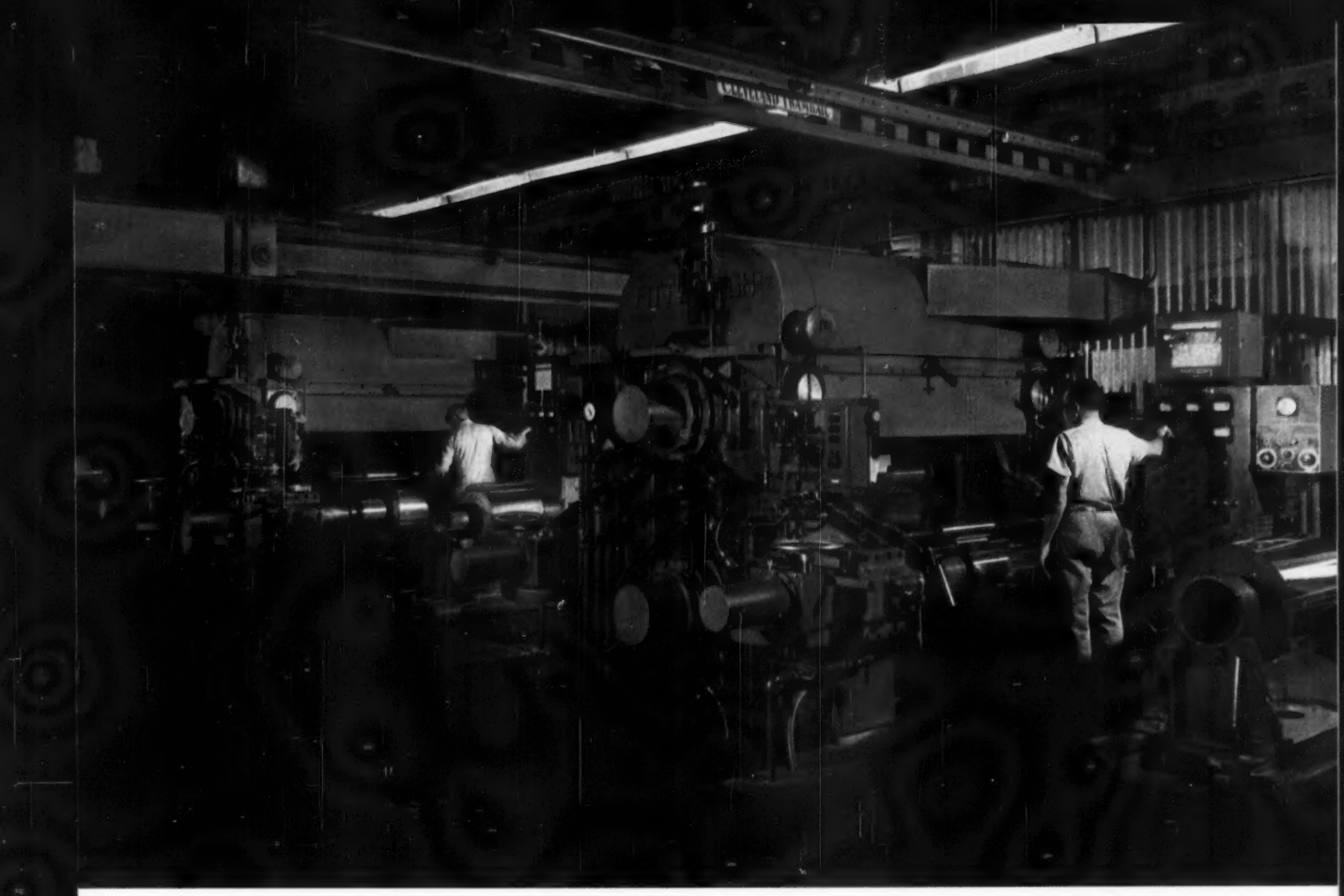
Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Millbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
Johnstown,Pa. B2 .....13.45
KansasCity,Mo. U3 ....13.70
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.



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at THE ANACONDA® ALUMINUM CO.

High quality aluminum foil as fine as .0002" in thickness is now being rolled at speeds up to 2,000 feet per minute on these new 64-inch, four-high foil mills at Anaconda Aluminum, Louisville, Ky. Heavy demand for this material requires round-the-clock operation with minimum down time for maintenance.

Design features include a hydraulically operated roll stand to control pressure; a direct drive to permit variable work roll diameters ideal for research in producing metal foil; and X-ray equipment for automatic gauge control.

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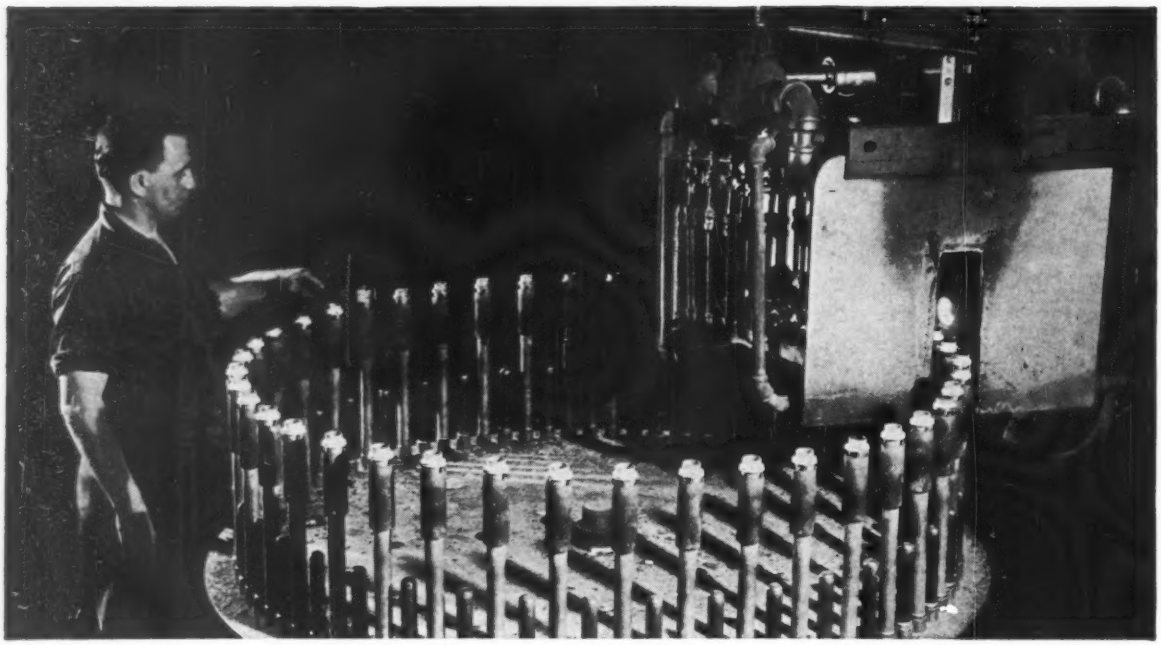

Rotating jig showing mounted assemblies entering and leaving gas-air furnace.

Left– brazed assembly. Right– components with preform ring of EASY-FLO *45.*

This Hartford, Connecticut, company makes—in volume—an assembly that goes into the overflow system of household appliances. The assembly consists of brass tubing and a machined brass casting. The two components are joined by a preplaced ring of Handy & Harman EASY-FLO 45 silver brazing alloy and HANDY FLUX. Heating is automatic gas-air; parts are placed on a rotating turntable to pass through the gas furnace. Every 60 working minutes, 650 assemblies are completed.

The advantages here are that the manufacturer can use thin-walled tubing with heavier, threaded components at no sacrifice in strength. Because of EASY-FLO's penetrating qualities, the entire shear area is fully as strong as the solid parts of the assembly, yet considerably lighter. And, casting and machining the components for this assembly have been greatly simplified.

Are you in pursuit of a metal-joining method which offers—among other advantages—high, uninterrupted production at low capital investment? You may easily find the answer in Handy & Harman silver brazing. Hundreds of manufacturers and fabricators of as many different products, parts and components are right now enjoying the speed, economy, strength and *flawlessness* of brazing. You can too. Just ask Handy & Harman, 82 Fulton Street, New York 38, N. Y.

FOR A GOOD START: BULLETIN 20

This informative booklet gives a good picture of silver brazing and its benefits... includes details on alloys, heating methods, joint design and production techniques. Write for your copy.

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Chicago, Ill.
Cleveland, Ohio
Dallas, Texas
Detroit, Mich.
Los Angeles, Calif.
New York, N. Y.
Providence, R. I.
San Francisco, Calif.
Montreal, Canada
Toronto, Canada

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10.	$10.10

POLISHED STAPLES	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga. lfper 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2.	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	Stone	An'ld Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.35	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)	Stone	An'ld Galv. Stone
Ala.City,Ala. R2	.9.00	9.55**
Aliquippa J5	..8.65	9.325§
Atlanta(48) A11	..9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	....9.00	9.55†
Cleveland A7	....9.00	....
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	....9.00	9.55†
Duluth A7	....9.00	9.55†
Fairfield T2	....9.00	9.55†
Houston(48) S5	..9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	....9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	..9.10	9.65†
LosAngeles B3	..9.95	10.625§
Minnequa C10	...9.25	9.80**
Monessen(48) P7	..8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	..9.95	10.50†
Rankin,Pa. A7	...9.00	9.55†
S.Chicago R2	....9.00	9.55**
S.SanFran. C10	.9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	.9.10	9.80
Struthers,O. Y1	..9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. ‡10c. ‡‡Less than 10c. §10.50c. §§11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packages	+35
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:

Packages	+ 5
Bulk	19

Through 1 in. diam., longer than 6 in.:

Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.85 ⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2½	12	58.73	68.83	52.13
2¾	12	62.62	73.40	55.59
3	12			

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13 75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	30.00	42.25	44.50	40.00	40.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54 75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47 00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	43.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Minimum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Nevilleisland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66 50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Nevilleisland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except; Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	7.32	10.20	10.95	52.00	8.34	7.95	10.65	15.95	7.91	7.51	10.13
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	7.32	9.88	11.14	56.18	8.46	8.16	11.25	16.06	8.30	7.75	10.37
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	8.83	10.46	10.50	52.00	11.11	8.86	11.01	16.23	9.47	8.78	10.94
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	61.27	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Memphis, Tenn.	9.84	10.05	....	....	11.24	9.92	12.74	....	10.33	10.12	11.41
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
Moline, Ill.	9.21	10.70	11.45	....	10.90	9.34	11.15	16.45	9.83	9.17	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.49	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	9.60	10.66	52.71	10.85	9.25	11.95	16.38	9.45	9.20	10.45
Pittsburgh	7.32	9.88	11.03	52.00	8.44	7.95	11.25	15.95	7.91	7.51	10.13
Portland, Oreg.	10.20	12.05	12.35	....	12.20	10.20	16.65	17.80	10.80	10.35	12.50
St. Louis	8.77	10.58	10.53	....	10.50	8.77	11.28	16.33	9.14	8.62	10.57
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.45	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.07	11.44	12.05	54.02	11.84	9.94	16.20	17.80	10.59	10.10	12.46
Spokane, Wash.	9.92	11.29	11.90	54.02	11.69	9.81	16.20	17.80	10.44	10.02	12.31

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. x 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 72-75%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel.	
Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75†
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	36.00-37.00†
Domestic	
Rail nearest seller	
48% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron:	
90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	39.90
Bronze, filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver	61.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90

Tungsten:	Dollars
Carbon reduced, 98.8% min., minus 65 mesh	nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	Nom.	Nom.	Nom.	Nom.	Nom.
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	Nom.	Nom.	Nom.	Nom.	Nom.
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	Nom.	Nom.	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.70	25.14	24.85	24.85	26.02
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.35	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	6.50	6.35	6.35	6.70
Bright Common Wire Nails (§)	7.50	7.40	7.40	7.00	7.60

†Per 82 lb net reel. § Per 100-lb keg. 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANINUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti.; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37. f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 50-56%, C 6-8%, Si 4-7%, 22.00c; Cr 58-63%, C 5-8%, Si 3-6%, 22.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 53-63%, C 3-5%, Si 2.5% max., 26.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr.; 0.010% max, 32.50c. Delivered.

Cr, 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr. 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr., 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr., 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (CB 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Scrap Composite Moves Higher

Advance of 16 cents on No. 1 heavy melting lifts market to $31.83, highest since May. Upturn is registered despite lack of heavy mill purchases. Further gains expected

Scrap Prices, Page 126

• **Chicago**—Despite practically no mill buying and drastic limitations of shipments against outstanding orders, a firming tone is detected in the market. The change is indicated partly in small sales outside the district and in a few instances of broker buying prices for certain open hearth grades.

The market lacks a good test. But one was expected in the last week of July via August offerings of No. 1 factory bundles by two auto stamping plants. In addition, a leading mill was to announce its buying price for No. 1 industrial heavy melting steel during August.

• **Pittsburgh**—Trade hit a new low when a regular buyer in the district withdrew from the market pending settlement of an incentive rate dispute. Bids on industrial bundles from the local plant of GM's Fisher Body Div. are expected to be about the same as last month's —possibly a little higher because of the small tonnage being offered.

• **Philadelphia**—Were it not for an active export demand, the scrap market here would be flat. Domestic users show no buying interest. Prices are unchanged.

The outlook for foreign buying is strong through August, but it's beclouded beyond that. Reports are that Japan may cut its purchases in this country by half during the September-November period. The drop would amount to about 350,000 tons. Considerable tonnage is leaving this port for England and continental Europe, particularly Italy.

• **New York** — Brokers' buying prices are unchanged. Export demand is active, but domestic buying, including steel and cast material, is dull.

• **Cleveland** — Consensus in the trade here is that prices have hit bottom, and the firmer tone will develop into an upward movement. No mill buying has been done, but a test of the market will be afforded by pending auto lists. Low generation of industrial scrap and slow processing at yards, due to the price level, tend to restrict the accumulation of scrap.

• **Youngstown**—Scrap buying continues in the doldrums in this important scrap consuming and producing area. No activity is expected the rest of the summer.

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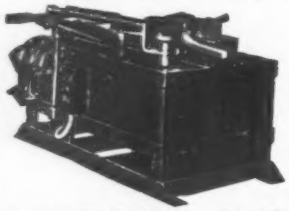

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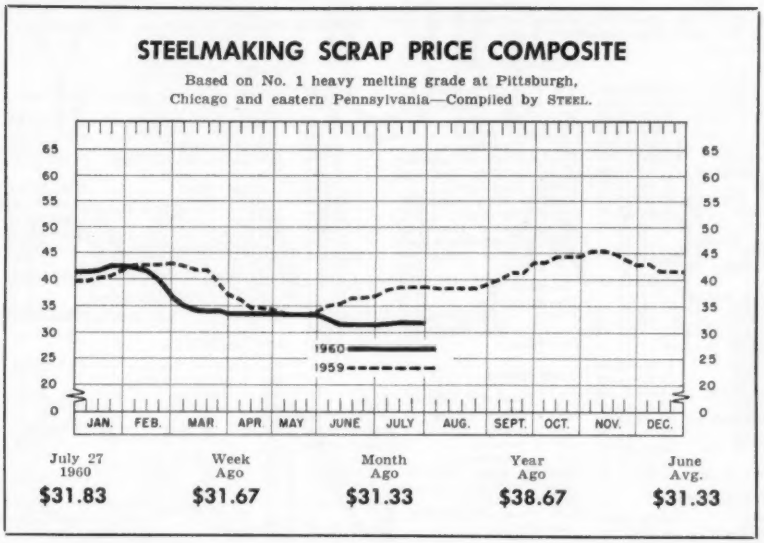

• **Detroit** — The scrap market is quiet here as the trade awaits auto lists. The feeling is that an upward movement will develop, resulting in price hikes of $1 to $2 a ton during the first week of August.

• **Buffalo**—More weakness in cast scrap hit the local market last week. Cupola cast declined $2 a ton to $41 on sales to local foundries. At the same time, the consumer price for No. 1 machinery cast was lowered $1 to a range of $47 to $48.

The mill scrap market marked time, with prices unchanged. Demand for mill scrap was limited due to slow mill operations. Dealers completed their July shipments early but failed to receive additional orders for mills for July delivery.

• **Cincinnati**—A local and an area mill are expected to enter the market this week with a repeat performance of a month ago: Limited buying on the same price level as July's. The trade continues to feel that prices for steelmaking grades are at bottom. Cast iron scrap, which has had some support from out-of-district buying, is showing signs of weakening.

• **St. Louis**—The scrap market displayed a strong undertone in some selected categories last week but not enough to alter quotations. The scrap trade hesitates to spend money for yard operations at present price levels. Railroads are storing much of their accumulations. Dealers often reject bids, awaiting a market upturn.

• **Houston**—The steel scrap market in the Southwest remains inactive, a condition that has varied only slightly in several weeks. Exports continue to influence the market to some extent, with prices higher than the domestic level. Prices have not been high enough on the domestic market to interest haulers, restricting intake.

• **San Francisco**—A watching, waiting game is being placed in the local steel scrap market. The continuing byword: No change.

• **Los Angeles**—The scrap market continues to drift. Exports account for the only activity.

• **Seattle**—Export demand is firming the market here. Further improvement is expected when domestic buying increases following the summer doldrums. Heavy melting, unprepared, advanced $2 a ton to $35 on No. 1 and $3 a ton to $33 on No. 2. Heavy breakable went up $2 a ton to $36.

Iron Ore . . .

Iron Ore Prices, Page 122

Arthur G. McKee & Co., Cleveland, will build the agglomeration section at the new iron ore mining and processing installation of U. S. Steel Corp.'s Columbia-Geneva Div. near Atlantic City, Wyo. The steel fabrication and erection on this project will be done by the American Bridge Div., U. S. Steel Corp.

The plant will be capable of turning out more than 4000 tons of high grade iron ore a day. It will utilize a process developed jointly by McKee and Allis-Chalmers Mfg. Co., Milwaukee.

Agglomerated iron ore from the Wyoming plant will be used to supplement the present sources of iron ore from the corporation's Geneva Works near Provo, Utah.

Pig Iron . . .

Pig Iron Prices, Page 121

Following a slight improvement a week or so ago, merchant pig iron demand has again slumped. Some producers regard the market as being about as slow as it can be but are hopeful that it will gain momentum in the next few weeks.

Although no merchant stacks along the eastern seaboard are in operation, supplies are more than ample to cover all needs even though imports have dropped considerably.

(*Please turn to Page* 131)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, July 27, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 27	$31.83
July 20	31.67
June Avg.	31.33
July 1959	38.45
July 1955	39.67

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
No. 1 factory bundles	35.00-36.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	18.00-19.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	36.00-37.00
3 ft and under	35.00-36.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	*39.00-40.00*
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	34.00-35.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	37.00-38.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	*49.00-50.00*
Rails, rerolling	51.00-52.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	31.00-32.00
No. 1 hvy melt., dealer	*30.00-31.00*
No. 2 hvy melting	27.00-28.00
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	*31.00-32.00*
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	31.00-32.00
No. 1 busheling, dealer	*30.00-31.00*
Machine shop turnings	13.00-14.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals, 3 ft	33.00-34.00
Punchings & plate scrap	35.00-36.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	34.00-35.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	45.00-46.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*34.50-35.50*
R.R. malleable	44.00-45.00
Rails, 2 ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Angles, splice bars	41.00-42.00
Axles	*51.00-52.00*
Rails, rerolling	*51.00-52.00*

Stainless Steel Scrap

18-8 bundles, solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	14.00-15.00
No. 1 bundles	28.00-29.00
No. 2 bundles	12.50-13.50
No. 1 busheling	24.00-25.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00†
No. 2 heavy melting	23.00-24.00†
No. 1 factory bundles	32.00-33.00
No. 1 bundles	31.00-32.00†
No. 2 bundles	17.00-18.00†
No. 1 busheling	31.00-32.00†
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00†

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random length	44.00-45.00
Cast steel	38.00-39.00
No. 1 railroad cast	46.00-47.00
Railroad specialties	43.00-44.00
Angles, splice bars	45.00-46.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	33.00-34.00†
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	33.00-34.00
No. 1 bundles	33.00-34.00†
No. 2 bundles	20.00-21.00†
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

BUFFALO

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00†
No. 1 bundles	29.00-30.00
No. 2 bundles	21.00-22.00
No. 1 busheling	29.00-30.00
Shovel turnings	17.00-18.00
Machine shop turnings	12.00-13.00
Cast iron borings	15.00-16.00
Low phos. structurals and plate, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*40.00-41.00*
No. 1 machinery	*47.00-48.00*

Railroad Scrap

Rails, random lengths	43.00-44.00
Rails, 3 ft and under	49.00-50.00
Railroad specialties	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	17.50-18.50
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos. 18 in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Heavy breakable cast	31.00-32.00
Charging box cast	*35.00-36.00*
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	51.00-52.00
Rails, random lengths	43.00-44.00

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	36.00
No. 2 bundles	20.00
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00
Machine shop turnings	15.00
Heavy turnings	28.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	40.00
Rail crop, 2 ft & under	53.00-54.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	38.00
Drop broken machinery	50.00
Malleable	46.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips solids	165.00-170.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.00-24.50
No. 2 heavy melting	19.00-20.00
No. 1 bundles	24.00-24.50
No. 1 busheling	24.00-24.50
Machine shop turnings	6.00-7.00
Shovel turnings	*8.50-9.00*
No. 1 cast	39.00-40.00
Mixed cupola cast	*33.00-33.50*
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	28.00-29.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	9.00-10.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	35.00-36.00
structurals & plate	35.00-36.00
Electric furnace bundles	32.00-33.00
Electric furnace:	
3 ft and under	31.00-32.00
2 ft and under	32.00-33.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	46.00-47.00
Unstripped motor blocks	36.00-37.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Angles, splice bars	39.00-40.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	9.00†
Shovel turnings	11.00†

Cast Iron Grades

No. 1 cupola	44.00†
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	36.00
Clean auto cast	45.00†
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00†
Rails, random lengths	38.00†
Rails, rerolling	48.00
Rails, 18 in. and under	41.00†
Angles, splice bars	41.00†

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 2 bundles	18.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	33.00-35.00
Heavy breakable	26.00
Foundry malleable	31.00†
Unstripped motor blocks	29.00-31.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00
No. 2 bundles	17.00
Machine shop turnings	15.00
Shovel turnings	15.00
Cast iron borings	*16.00*
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades

No. 1 cupola	*44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-34.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00-38.00
No. 2 heavy melting	32.00-35.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 1 hvy (unprepared)	*35.00*
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	*33.00*
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	*36.00*
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy. melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

†Nominal.
‡F.o.b. Hamilton, Ont.

YOUR DOLLAR CAN HELP THE U.S. TEAM WIN IN ROME

The possibility of the U.S. team winning the 1960 games in Rome this year depends to a great extent on what funds are available. The team needs money to help it achieve championship status. Many other countries, like Russia, finance their Olympic teams with government subsidies. The U.S. does not do this. Your dollar is needed. It is needed now to help the U.S. team win at Rome!

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To acknowledge your contribution, arrangements have been made to send a special Olympic souvenir postcard to you or anyone you may specify. This postcard will bear a special Italian commemorative Olympic stamp. It will be mailed direct from Rome, Italy to you or anyone you specify . . . and will be autographed by leading members of the U.S. team.

The U.S. team needs funds to help them seek out the top U.S. athletes. To train them. To transport them to Italy. And to feed, clothe and house them while they are participating in the Olympic Games. You and others like you are the sole support of the U.S. team. Please mail your contribution today.

Donations are deductible on income tax returns.

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I want to help the U. S. team win the 1960 Olympic Games. Here is my $1.00 donation. Please put my name on the mailing list for the special Olympic autographed souvenir postcard.

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This Space Donated by STEEL

Aluminium Announces New Process

Nonferrous Metal Prices, Pages 130 & 131

A TYPICALLY terse statement issued by Aluminium Ltd. last week had the effect of an exploding bombshell on the aluminum scene.

The announcement said only that the company would construct facilities at Arvida, Que., "for the production of aluminum by a basically new process."

As might be expected, Aluminium wasn't willing to elaborate to any extent. H. H. Richardson, chief technical officer, said that bauxite would be the main raw material.

He added: "The new process does not appreciably reduce the large power requirement which is an outstanding characteristic of the conventional process. It does, however, give promise of substantial savings in other elements of production cost and in the investment required per ton of capacity."

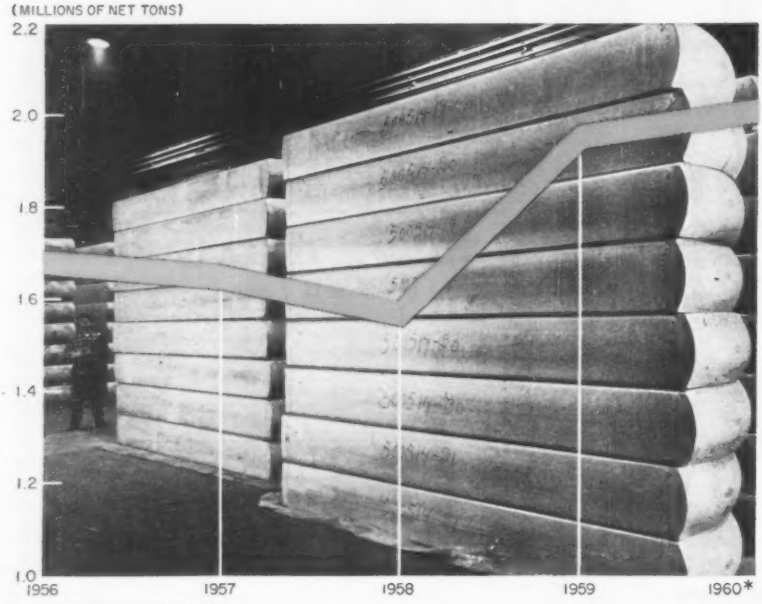
• **What Is It?**—Perplexed metalmen asked one another: Just what has Aluminium got? The hint that power requirements will be the same but other production costs less has resulted in speculation that perhaps Aluminium has developed a technique to circumvent the Bayer alumina process and go straight from bauxite to aluminum. Other speculation centers around whether Aluminium has eliminated the need for pots in the production cycle either by: 1. Catalytic reduction and distillation (reducing bauxite and clay and distilling off aluminum). 2. The subhalide process (placing low grade bauxite in an arc furnace and reducing it with a carbon, then running hot chloride gas over the mixture in a reactor chamber, and finally coming up with aluminum chloride).

All told, six or seven processes have been used up to now to simplify aluminum making. Metalmen seem to think the Aluminium process is an improvement of one of those. Which one it may have perfected is anyone's guess at this point, but the company has enough faith in the ultimate practicality of the project to pour $4 million into an experimental unit with 6000 to 8000 tons annual capacity.

In the Markets

• **Good Year for Nickel**—Despite the slowdown in steelmaking operations, nickel will have a banner year. The Business & Defense Services Administration estimates U. S. consumption will reach 255 million lb this year compared with 227 million lb in 1959 and 158 million lb in 1958. Nickel supplies are more than ample, says BDSA.

2nd Half Aluminum Output to Hit All-Time High



Source: The Aluminum Association
*STEEL estimate.

DESPITE disappointing sales, U. S. primary aluminum producers are set to turn out record tonnage this year. STEEL's forecast: Close to 2,060,000 tons.

The industry produced 1,007,353 tons in the first half and is currently producing at an annual rate of 2,061,000 tons. Odds are good the rate will be up modestly this fall.

While there are faint glimmerings that business is on the upswing and hopes are high for a fourth quarter rebound, producers will end the year with pretty hefty unsold stocks (they're estimated at 30 days and up now). Even the healthy export market won't bridge the gap left by higher production and less demand.

Supply looks good for the foreseeable future. The industry has a current capacity of 2,430,950 tons and an additional 205,000 tons that could be brought in on short notice.

Quality control at Standard is second to none among the nation's major specialty product steel plants. It is maintained by the most accurate, up-to-date testing equipment available. The laboratory facilities operate around the clock to keep all vital information flowing to our metallurgists, shop foremen, mill and machine operators—as well as to plant management, and, of course, our customers.

Bring your next unusual product to us—we'll welcome the opportunity to serve you regardless of the alloy it might require. Send for the free illustrated booklet, "Quality Control at Standard."

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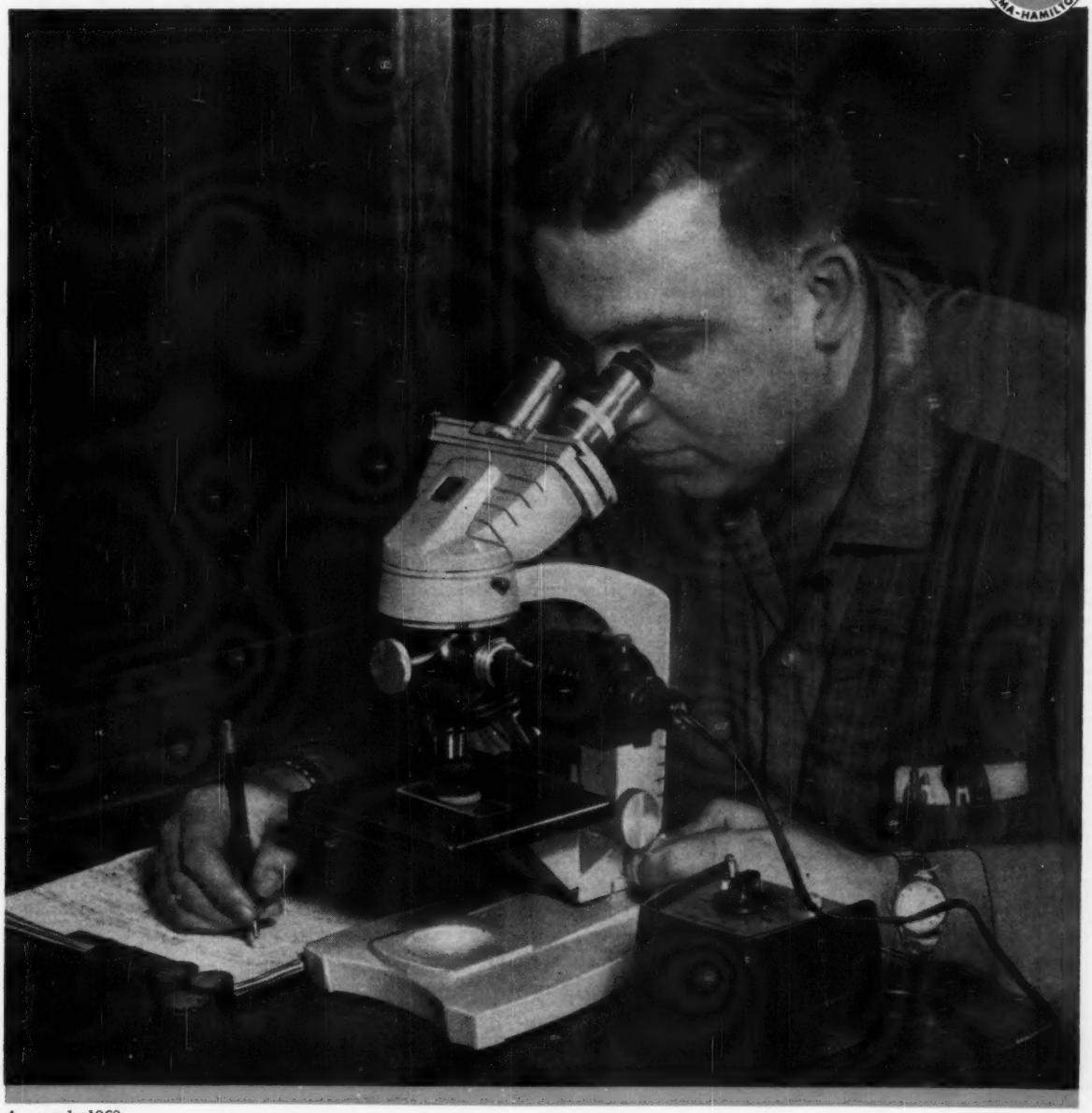

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 104.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.35-4.50.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-24.25; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-24.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam.	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	50.00b	54.86c	....	58.32
Yellow Brass	50.57	36.06d	50.86	54.23
Low Brass, 80%	53.53	53.22	53.82	57.09
Red Brass, 85%	54.58	54.27	54.87	58.14
Com. Bronze, 90%	56.17	55.86	56.46	59.48
Manganese Bronze	58.86	52.21	62.69	....
Muntz Metal	53.20	48.26	....	....
Naval Brass	55.12	48.68	61.43	58.78
Silicon Bronze	62.86	61.80	62.15	80.79
Nickel Silver, 10%	65.96	68.06	66.06	....
Phos. Bronze	77.44	78.19	77.69	79.37

SCRAP ALLOWANCES e (Based on copper at 30.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	29.000	28.250	
Yellow Brass	22.250	21.250	20.250
Low Brass, 80%	24.750	24.500	24.000
Red Brass, 85%	25.750	25.500	25.000
Com. Bronze, 90%	26.750	26.500	26.000
Manganese Bronze	20.875	26.625	19.875
Muntz Metal	20.875	20.625	20.125
Naval Brass	20.750	20.500	20.000
Silicon Bronze	28.375	28.125	27.375
Nickel Silver, 10%	26.875	26.625	14.937
Phos. Bronze	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 4.50-5.00; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 8.00-8.50; segregated low copper clips, 16.00-16.50; segregated high copper clips, 14.50-15.00; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.25; No. 2 heavy copper and wire, 25.50; light copper, 22.00; refinery brass (60% copper) dry copper content, 23.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.25; No. 2 heavy copper and wire, 25.50; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 17.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.
Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 122.50; 200-499 lb, 122.00; 500-999 lb, 121.50; 1000 lb or more, 121.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 81.20; 100-600 lb, 71.70; 700-1900 lb, 69.00; 2000-9900 lb, 67.10; 10,000 lb or more, 65.80.

Stannous Chloride (Anhydrous): 25 lb, 156.80; 100 lb, 152.00; 400 lb, 149.50; 800-19,900 lb, 108.70; 20,000 lb or more, 102.60.

Stannous Sulphate: Less than 50 lb, 141.90; 50 lb, 111.90; 100-1900 lb, 109.90; 2000 lb or more, 107.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 125)

In other sections of the country, operators of blast furnaces have cut operations to counteract the drop in consumption. Many foundries are closed for vacations, and other consumers are operating at reduced levels. National Tube Div., U. S. Steel Corp., closed down a large part of its Lorain, Ohio, plant one week for repairs. Blast furnaces, steelmaking furnaces, and blooming mill departments are closed.

American Steel & Wire Div., U. S. Steel Corp., banked its "A" blast furnace at Cleveland. It will remain idle until an accumulation of orders justifies resumption of production. The "D" furnace has been shut down since the end of May.

Wire . . .

Wire Prices, Pages 116 & 119

Imported wire and wire products continue to cut deeply into the business of domestic producers. Colorado Fuel & Iron Corp. reports its sales of wire in the second quarter were hurt by foreign competition.

Output of wire mills in the Los Angeles district was up 5 per cent in July from the June total, but the pace of business remains slow.

Tubular Goods . . .

Tubular Goods Prices, Page 120

Tubular goods are among the slowest moving finished steel products. However, rising demand is noted in stainless steel—aircraft and missile fabricators are buying for hydraulic tubes.

Combined U. S. and Canadian rotary rig operations totaled 1904 in the week ended July 23. Hughes Tool Co., Houston, reported 1730 rotaries were drilling in the U. S., 20 more than in the previous week. Canadian operations rose from 143 to 173 during the week.

Lone Star Steel Co., Dallas, reopened its No. 1 electricweld pipe mill at its E. B. Germany Works, Lone Star, Tex., after a five week closedown.

Revises Price Schedule For Chromium Alloys

Union Carbide Metals Co., a division of Union Carbide Corp., New York, has announced new grades and prices for charge chrome alloys. New specifications and prices, effective July 20, in cents per pound of contained chromium (carload, lump, bulk, delivered) are: Charge Chrome 58-63 (Cr 58-63%, C 5-8%, Si 3-6%), 22.50c; blocking chrome (Cr 55-63%, C 4-6%, Si 8-12%), 23.50c; refined chrome (Cr 53-63%, C 3-5%, Si 2.5% max), 26.00c.

Standard high carbon ferrochrome remains at 28.75c per pound of contained chromium.

Effective July 22, Union Carbide added a grade: Charge Chrome 50-56 (Cr 50-56%, C 6-8%, Si 4-7%), 22.00c per pound of contained chromium, delivered in carload lots, lump, bulk.

Ferroalloys . . .

Ferroalloy Prices, Page 123

Consumption of manganese ferroalloys and metal in the U. S. in March: Ferromanganese, 86,005 tons high carbon, 7689 medium and

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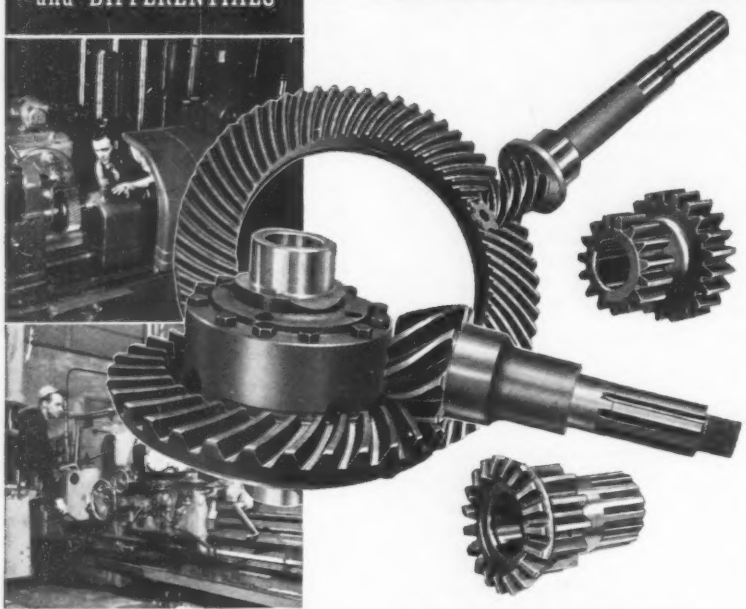

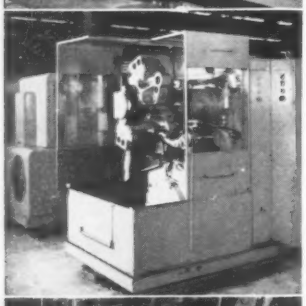

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low carbon; silicomanganese, 10,809; spiegeleisen, 4196; manganese metal, 1345; briquets, 724.

Use in the first quarter: Ferromanganese, 258,997 tons high carbon, 23,287 tons medium and low carbon; silicomanganese, 34,424; spiegeleisen, 12,906; manganese metal, 4436; briquets, 2247.

Stocks at the end of March: Ferromanganese, 114,651 tons high carbon, 11,108 medium and low carbon; silicomanganese, 12,461; spiegeleisen, 11,592; manganese metal, 1584; briquets, 1188.

March consumption by end uses:

Steel ingots—82,587 tons of high carbon ferromanganese, 7008 tons of low and medium carbon; silicomanganese, 9599 tons; spiegeleisen, 2892 tons; manganese metal, 1102.

Steel castings—1624 tons of high carbon ferromanganese, 277 tons of low and medium carbon; silicomanganese, 1019 tons; spiegeleisen, 157; manganese metal, 21; briquets, 13.

Steel mill rolls—94 tons of high carbon ferromanganese, 22 tons of medium and low carbon; silicomanganese, 66; spiegeleisen, 67.

Gray and malleable castings—1202 tons of high carbon ferromanganese, 309 tons of medium and low carbon; silicomanganese, 12 tons; spiegeleisen, 1080 tons; briquets, 709 tons.

Alloys—491 tons of high carbon ferromanganese, 73 tons medium and low carbon; silicomanganese, 82; manganese metal, 222 tons; briquets, 1 ton.

The combined tonnage of iron ore, coal, and grain moved on the Great Lakes in June totaled 21,220,763 net tons vs. 22,493,773 tons moved in the same month last year, reports the Lake Carriers' Association, Cleveland. The drop was due chiefly to a reduction in iron ore shipments.

Of the three commodities, only grain showed an increase, with June shipments totaling 1,803,264 tons vs. 1,794,331 last year. Ore cargoes dropped to 13,482,927 tons, over 1 million tons less than in the like 1959 month. Coal shipments of 5,934,572 tons came close to the 6,153,664 tons moved in June last year.

Combined shipments of the three commodities this year to July 1 were ahead of those in the corresponding period of 1959, totaling 56,427,516 tons vs 53,926,931 a year ago.

Advertising Index

Air Reduction Sales Co., A Division of Air Reduction Co., Inc. 63
Allen Manufacturing Co. 96
Allied Oil Co., Division of Ashland Oil & Refining Co. 77
American Welding & Mfg. Co., The 38
Ashland Oil & Refining Co., Allied Oil Co. Division 77
Atlas Car & Mfg. Co. 10

Baird Machine Co., The 16
Baldwin-Lima-Hamilton, Standard Steel Works Division 129
Basic Products Corporation, Hevi-Duty Electric Co. Division 43
Bellows Co., The, Division of International Basic Economy Corporation 12
Bethlehem Steel Co. 1, 17, 18, 19, 20

Cattie, Joseph P., & Brothers, Inc. 124
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 13
Colorado Fuel & Iron Corporation, The 37
Cone-Drive Gears, Division Michigan Tool Co. 104

Dana Corporation, Parish Pressed Steel Division 24
Detroit Steel Corporation 44
Dykem Co., The 124

Eastman Kodak Co., X-ray Division 89
Electric Controller & Mfg. Division, Square D Co. ..... Inside Front Cover
Ex-Cell-O Corporation 6
Ex-Cell-O Corporation, Machinery Division .. 7

Fairfield Manufacturing Co., Inc. 132
Fischer Special Mfg. Co. 103
Fuji Iron & Steel Co., Ltd. 108

Giddings & Lewis Machine Tool Co. 25, 26, 27, 28

Handy & Harman 118
Harbison-Walker Refractories Co. 4
Hevi-Duty Electric Co., A Division of Basic Products Corporation 43
Homestead Valve Manufacturing Co. 29
Hyde Park Foundry & Machine Co. 133
Hydro-Line Manufacturing Co. 36

Inland Steel Co. 48
International Basic Economy Corporation, Bellows-Valvair Divisions 12
International Packings Corporation 80

Kardong Brothers, Inc. 124

Manning, Maxwell & Moore, Inc., Shaw-Box Crane & Hoist Division 32
Michigan Tool Co., Cone-Drive Gears Division 104
Midland-Ross Corporation, Surface Combustion Division 30, 31
Miller Electric Manufacturing Co., Inc. 101
Mobil Oil Co. 22, 23
Morgan Construction Co. 57
Morse Twist Drill & Machine Co., A Division of Van Norman Industries, Inc. 11

National Machinery Co. 71
National Steel Corporation, Weirton Steel Co. Division 64
Northern Engineering Works 3

Optical Gaging Products, Inc. 75
Osborn Manufacturing Co., The 105

Pangborn Corporation ..... Inside Back Cover
Parish Pressed Steel Division of Dana Corporation 24
Pines Engineering Co., Inc. 68
Pittsburgh Engineering & Machine Division, Pittsburgh Steel Foundry Co. 117
Pittsburgh Steel Co. 46, 47

Republic Steel Corporation 14, 15
Rodney Metals, Inc. 99
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 37
Royal McBee Corporation, Data Processing Division 58
Ryerson, Joseph T., & Son, Inc. 8, 9

Seaway Steel Corporation 106
Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc. 32
SKF Industries, Inc. 2
Square D Co., Electric Controller & Mfg. Division ..... Inside Front Cover
Standard Steel Works Division, Baldwin-Lima-Hamilton 129
Surface Combustion, A Division of Midland-Ross Corporation 30, 31

Textron, Inc. 117
Tinnerman Products, Inc. 72
Torrington Co., The 21
Tube Methods, Inc. 70

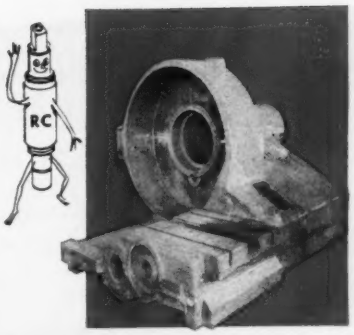
Ulbrich Stainless Steels 111
Union Carbide Corporation, Union Carbide Metals Division 91
Union Carbide Metals Co., Division of Union Carbide Corporation 91
U. S. Electrical Motors, Inc. ..... Back Cover

Valvair Corporation, Division of International Basic Economy Corporation 12
Van Norman Industries, Inc., Morse Twist Drill & Machine Co. Division 11

Ward Steel Co. 125
Warner Electric Brake & Clutch Co. ..33, 34, 35
Wean Equipment Corporation 67
Weinstein Co. 131
Weirton Steel Co., A Division of National Steel Corporation 64
Wheland Co., The, Foundry Division 134

~ ~ ~

Table of Contents
Facing Inside Front Cover
Classified Advertising, Page 131



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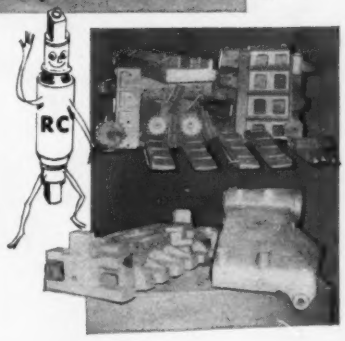

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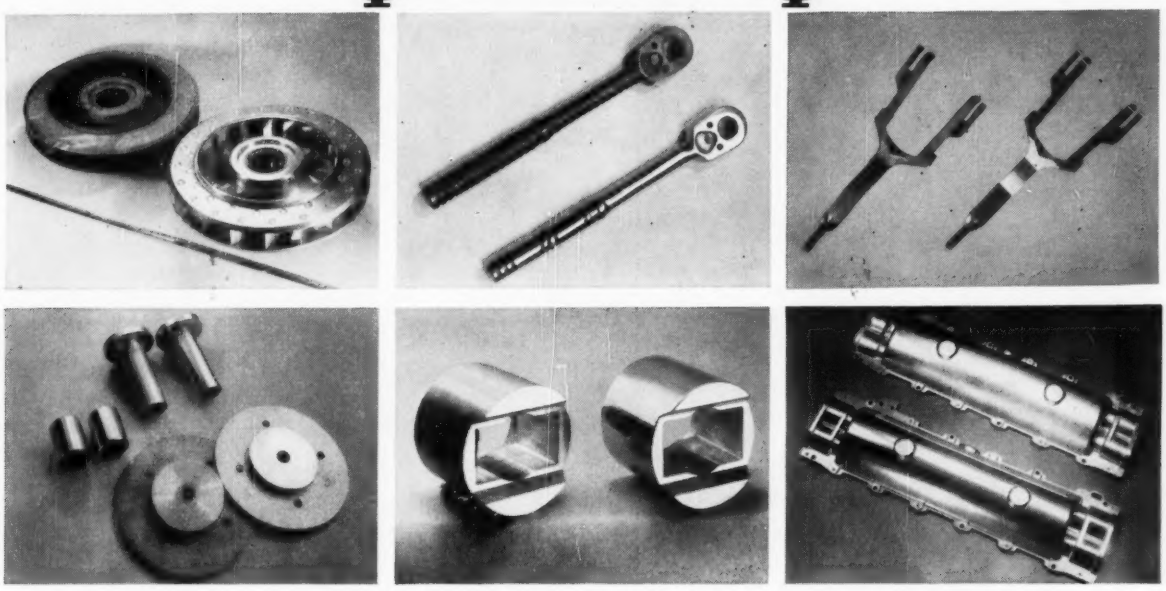

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* Pat. No. 2,422,786; June 24, 1947

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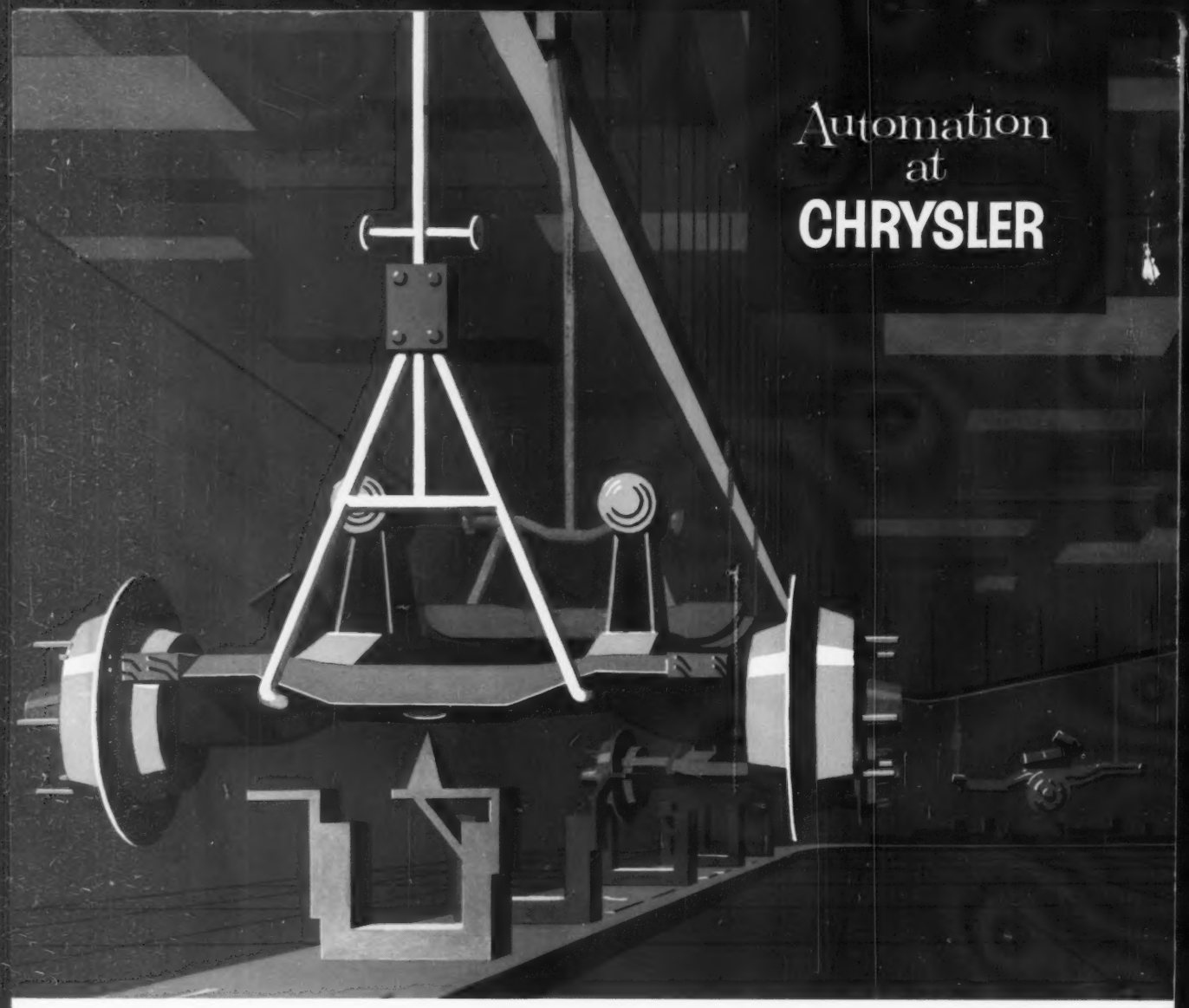

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